IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF

PATENT APPEALS AND INTERFERENCES

In re Application of: Josef Weiland	)	
	)	
	)	
Serial No.: 10/533,108	)	Group Art Unit: 3727
Filed: 05/27/2005	)	Examiner: Bryan R. Muller
	)	Confirmation No.: 4794
For: Device and method for machining workpieces	)	
	)	

Board of Patent Appeals and Interference
U.S. Patent and Trademark Office
P.O. Box 1450
Alexandria, VA. 22313-1450

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STATEMENT OF REAL PARTY IN INTEREST

As Assignee of U.S. Patent Application Serial No. 10/533,108, the real party in interest is: LISSMAC Maschinenbau u. Diamantwerkzeuge GmbH, a German corporation having a place of business at Lanzstraße 4, D-88410 Bad Wurzach (Germany).

STATEMENT OF RELATED CASES AND APPEALS

None.

STATEMENT OF JURISDICTION

This is an Appeal from the Final Office Action mailed May 4, 2009. The Board of Patent Appeals and Interferences has jurisdiction pursuant to 35 U.S.C. § 6(b).

TABLE OF AUTHORITIES

STATUS OF THE CLAIMS AND AMENDMENTS

Claims 1-78 were originally filed in the application. Claims 79-89 were adding during prosecution. Claims 1-38, 45, 47, 51, 54 and 77 have been canceled. Claims 86-89 have been withdrawn from consideration. Claims 39-44, 46, 48-50, 52, 53, 55-76 and 78-85 are pending.

In a Final Office Action dated May 4, 2009, the Examiner rejected Claims 39-44, 46, 48-50, 52, 53, 55-76 and 78-85. No claims were allowed.

The Applicants filed a Notice of Appeal and requested a Pre-Appeal Brief Review on August 3, 2009. The Pre-Appeal Brief conference was held and no changes were forthcoming from the Panel as to the underlying final rejection. The Review Panel has maintained the status of the claims as set forth in the Final Office Action.

The Applicant is appealing the rejection of all of the rejected claims, namely, Claims 39-44, 46, 48-50, 52, 53, 55-76 and 78-85.

The Applicant has not amended the claims subsequent to the May 4, 2009 Final Office Action.

SUMMARY OF CLAIMED SUBJECT MATTER

This application and the claims under appeal include independent claims 39, 46, 76, 78 and 80. A concise explanation of the subject matter defined in each of these independent claims is provided below. Speaking generally, the present invention concerns a method and apparatus for machining a metallic workpiece having oppositely disposed main surfaces and one or more edge surfaces, such as side edges and cut edges, angularly disposed relative to the main surfaces. The apparatus performs at least one of removing an oxide layer, grinding, deburring and descaling the surface of the workpiece. Each of the independent claims has been amended during prosecution to include the subject matter that the apparatus and its associated conveyors and brushes are arranged to machine substantially all the side edges and cut edges of the workpiece.

Claim 39 recites an apparatus having rotating brushes for machining a metallic workpiece to remove an oxide layer from the metal workpiece. The metal workpiece is generally planar, but has edge surfaces including the outer edge of the workpiece as well as optionally edge surfaces due to holes, apertures and/or cutouts formed in the metal workpiece. The claim specifically recites that the brushes on the conveyor devices are guided along both the main surface *and* the edge surfaces of the workpiece so that the brushes of the first, second, third and fourth conveyors machine "... substantially all the edge surface of the workpiece in opposite directions."

Claim 46 similarly recites an apparatus having rotating brushes for machining a metallic workpiece to remove an oxide layer from the metal workpiece. The metal workpiece is generally planar, but has edge surfaces including the outer edge of the workpiece as well as optionally edge

surfaces due to holes and/or cutouts formed in the metal workpiece. The claim specifically recites that the brushes on the conveyor devices "... machine the edge surface of the workpiece in opposite directions to ensure that substantially all the edge surface of the workpiece is machined."

Claim 76 recites a method for machining metallic a workpiece to remove an oxide layer from the metal workpiece. The metal workpiece has edge surfaces including the outer edge of the workpiece as well as optionally edge surfaces due to holes, apertures and/or cutouts formed in the metal workpiece. The claim specifically recites the step that the brushes on the conveyor devices are arranged for "... ensuring contact and complete machining of the edge surface between the at least one brush (3) of the first, the second, the third and the fourth conveyor devices (2, 2, 2, 2) along the entire respective first and second edge surface of the workpiece."

Claim 78 recites an apparatus having a first and second oppositely rotating brushes for machining a metallic workpiece to remove an oxide layer from the metal workpiece. The claim specifically recites that "... the first and second conveyor devices (2, 2) both rotate so as to guide the brushes (3) along an entirety of the first and second main edge surface of the workpiece."

Claim 80 recites an apparatus having first and second oppositely rotating brushes and a guide passage for receiving a metallic workpiece to remove an oxide layer from the metal workpiece. The claim specifically recites that the guide passage has "... a region defined by the guide passage where the first and second brushes contact the metallic workpiece to the extent that at least the side edge surface is fully machined."

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

I. The Applicant is appealing the rejection of claims 39-44, 48-50, 52, 53, 55-75 and 85 under 35 U.S.C. § 112, first paragraph, for failing to comply with the written description requirement. Specifically, the Examiner states that there is no support in the original application that the first and second conveyor devices as well as the third and fourth conveyor devices each contact and machine substantially all of the edge surface of the workpiece.

II. The Applicant is appealing the rejection of claim 76 under 35 U.S.C. § 112, first paragraph, for failing to comply with the written description requirement. Specifically, the Examiner states that there is no support in the original application that at least one brush on all of the first through fourth conveyor devices contact and machine the entire edge surface of the workpiece.

III. The Applicant is appealing the rejection of claims 78 and 79, under 35 U.S.C. § 112, first paragraph, for failing to comply with the written description requirement. Specifically, the Examiner states that there is no support in the original application that brushes are guided along the entire edge surface of the workpiece.

IV. The Applicant is appealing the rejection of claims 80, 81 and 82, under 35 U.S.C. § 112, first paragraph, for failing to comply with the written description requirement. Specifically, the Examiner states that there is no support in the original application that the edge surface of the workpiece is fully machined.

V. The Applicant is appealing the rejection of claims 39-42, 46, 48-50, 57-61, 63, 71-74 and 78 under 35 U.S.C. § 103(a), as obvious over the Ingromat-Cleaner CH 29 publication

("Ingromat"), or in the alternative, as obvious over Ingromat in view of U.S. Patent No. 2,767,413 to Herrington ("Herrington `413").

VI. The Applicant is also appealing the rejection of claim 43 under 35 U.S.C. § 103(a), as obvious over Ingromat or, alternatively, Ingromat in view of Herrington `413, and further in view of U.S. Patent No. 2,958,882 to McCormick et al. ("McCormick `882").

VII. The Applicant is also appealing the rejection of claim 44 under 35 U.S.C. § 103(a), as obvious over Ingromat or, alternatively, Ingromat in view of Herrington `413, and further in view of U.S. Patent No. 559,166 to Derby ("Derby `166").

VIII. The Applicant is also appealing the rejections of claims 52, 55, 56 and 75 under 35 U.S.C. § 103(a), as obvious over Ingromat in view of Herrington `413.

IX. The Applicant is also appealing the rejections of claims 53, 76, 79-81, 83 and 84 under 35 U.S.C. § 103(a), as obvious over Ingromat or, alternatively, Ingromat in view of Herrington `413, and further in view of U.S. Patent No. 5,237,716 to Lisec ("Lisec `716").

X. The Applicant is also appealing the rejection of claim 82 under 35 U.S.C. § 103(a), as obvious over Ingromat in view of Lisec `716 or, alternatively, Ingromat in view of Herrington `413 and Lisec `716, and further in view of U.S. Patent No. 5,634,397 to Hutchinson ("Hutchinson `397").

STATEMENT OF FACTS

- This application was filed as a U.S. National Stage Application on May 27, 2005.
- A Non-Final Rejection was issued on July 27, 2006
- Applicant's Arguments/Remarks were made in an amendment filed January 3, 2007.
- An interview with the Examiner took place on February 7, 2007 and the Examiner issued an Interview Summary Record on February 15, 2007.
- A Non-Final Rejection was issued on April 2, 2007.
- Applicant's Arguments/Remarks were made in an amendment filed August 6, 2007.
- A Final Rejection was issued on November 1, 2007.
- Applicant's Arguments/Remarks were made in an amendment filed February 1, 2008.
- An Advisory Action was issued February 12, 2008.
- An interview with the Examiner took place on March 24, 2008 and the Examiner issued an Interview Summary Record on March 27, 2008.
- Applicant filed a request for Continued Examination (RCE) on April 1, 2008.
- A Non-Final Rejection was issued on June 2, 2008.
- Applicant's Arguments/Remarks were made in an amendment filed October 6, 2008.
- A requirement for an Election/Restriction was filed on December 21, 2008.
- A response to the Election/Restriction was filed on February 1, 2009.
- An interview with the Examiner took place on February 5, 2009 and the Examiner issued an Interview Summary Record on February 11, 2009.
- A Final Rejection was issued on May 4, 2009.
- An interview with the Examiner took place on May 5, 2009 and the Examiner issued an Interview Summary Record on May 7, 2009.
- A Notice of Appeal was filed with a Pre-Brief Conference request on August 3, 2009.
- A Pre-Brief Appeal Conference decision was issued on September, 4, 2009.

ARGUMENT

A. THE REJECTION OF CLAIMS 39-44, 48-50, 52, 53, 55-76, 78-82 AND 85 UNDER 35 U.S.C. § 112, FIRST PARAGRAPH, FOR FAILING TO COMPLY WITH THE WRITTEN DESCRIPTION REQUIREMENT IS IN ERROR BECAUSE THE SPECIFICATION SUPPORTS THE APPLICANT'S AMENDMENTS AND THE PRESENTLY CLAIMED SUBJECT MATTER.

I. Rejection under 35 U.S.C. § 112 ¶1 of Independent Claim 39

In the Final Official Action mailed May 4, 2009 the Examiner has rejected independent Claim 39 and its dependent claims, 40-44, 48-50, 52, 53, 55-75 and 85, under 35 U.S.C. § 112, first paragraph, for failing to comply with the written description requirement. At paragraph 11 on pg. 5 of the Final Action it is asserted that "there is no support in the original application that the first and second conveyor devices as well as the third and fourth conveyor devices each contact and machine substantially all of the edge surface of the workpiece." Thus, the only question at issue with respect to this first ground of rejection is whether there is sufficient support in the Applicant's specification to support Claim 39 and specifically, the machining of *substantially all* of the edge surface of the workpiece.

By way of background, the Applicant's claims recite an apparatus and method for fully machining a metallic workpiece, for example machining a metal plate to remove an oxidation layer from the entire metal plate, and in particular, to machine and remove this oxidation layer from side surfaces, cut surfaces and edges of the metal plate. Para. [016] of Applicant's Specification states:

> The present invention is based on the object of resolving the above drawbacks of the prior art, and in particular of providing a fast, simple and

> inexpensive apparatus and a method for machining metallic workpieces in strip or plate form, in particular for removing the oxide layer from cut surfaces and/or cut edges thereof.

As discussed in the Applicant's specification at paragraphs [007]-[010], laser cutting of a metal plate leaves an oxide layer on the cut surfaces and edges. This oxide layer is very difficult to remove, i.e. machine, from the metal plate. In particular, it is very difficult to remove this oxide layer from inner cut surfaces and edges of cut-outs, holes and apertures cut or formed in the metal plate. The Applicant's specification at paragraph [011], last sentence, also points out that the known brushes and rollers are subject to uneven wear and are prevented, for various reasons, from penetrating into and machining such cut-outs, holes or apertures in the metal plate.

To clarify this aspect of the Applicant's invention, i.e., that the brushes are arranged and positioned to penetrate deeply into such cut-outs, holes and apertures to machine all cut surfaces and edges of the metal plate, in a Response dated October 2, 2008 the Applicant amended claim 39 to include the feature:

> ... wherein the at least one brush of each of the first and second conveyor devices machine *substantially all the edge surface* of the workpiece in opposite directions, and the at least one brush of each of the third and fourth conveyor devices machine *substantially all the edge surface* of the workpiece in opposite directions.[1] [Emphasis Added]

In maintaining the lack of written description rejection of Claim 39, the Final Official Action at page 7 includes the following analysis of the phrase "substantially all" of Claim 39:

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[1] Independent Claim 46 recites similar claim language, "wherein the at least one brush of each of the first and second conveyor devices machine the respective first and second main surfaces and the edge surface of the workpiece in opposite directions to ensure *that substantially all the edge surface of the workpiece is machined.*"

NOTE: The other pending claims including similar limitations that claim that "substantially all of the edge surface" is contacted by brushes and/or machined is only considered to be supported by the original application under the broadest reasonable interpretation of the term 'substantially all' meaning at least portions of the edge surface are machined.

As the Applicant understands this argument, the Examiner is not giving the term "substantially" the broadest reasonable interpretation, but is in fact giving it a particularly narrow interpretation. This interpretation limits the term "substantially all" to include only some "portions" of the edge surface. The Applicant agrees that the term "substantially all" should be given its broadest interpretation but that the broadest interpretation includes not only "portions" of the edge surface, but *all* the edge surface.

The Final Official Action at page 5, para. 11 asserts "[a]t most, the original specification supports that the edge surface is machined but there is no sufficient support that *substantially all* of the edge surface is machined by each pair of the first and second conveyor devices and the third and fourth conveyor devices" [Emphasis Added].

Actually, what Applicant's original specification recites at paragraph [020] is:

[20] The inventor has discovered that, surprisingly, the linear profile of the brush in the region of the workpiece to be machined ensures that the brush penetrates into *all* cutouts or holes in the workpiece and therefore removes the oxide layer *at all* cut surfaces and cut edges. [Emphasis Added]

It is the Applicant's position that the clause "... at all cut surfaces and cut edges" is not limited to only "some" or "a portion" of the cut surfaces or cut edges. The express meaning of "all" includes the whole, or entire cut surface and side edge. The Merriam-Webster Online

Dictionary defines "all" as "**1 a:** the whole amount, quantity, or extent of <needed *all* the courage they had> <sat up *all* night>."

Besides being express, it is a reasonable interpretation of this clause to include not only a portion, but all, i.e., the entire and complete cut surface and cut edges.[2] That the claim term *substantially all* should be given its broadest interpretation to include a "portion" and "all" of the entire surface makes complete sense, and is entirely reasonable, especially when interpreted in light of the context of the entire disclosure. In the Applicant's Summary of the Invention at paragraph [021] it is explained that:

> [021] It is advantageous for the apparatus according to the invention to machine the surfaces, i.e. the main surfaces of the metallic workpieces in strip or plate form and also to descale the cut surfaces and cut edges. Simultaneous descaling of the cut surfaces and cut edges and cleaning of the main surfaces was not possible with the apparatuses which have been disclosed hitherto.

Clearly the disclosure explains and describes an apparatus intended for the **simultaneous** removal of the oxide layer on the entirety of the main surfaces, cut surfaces and edge surfaces of the metal workpiece, which provides a significant improvement over conventionally known methods which require a number of subsequent machining steps on different machines to remove the oxide layers from all the cut surfaces of the metal plate. Please see Applicant's Background of the Invention at paragraph [009]. Also, paragraphs [069] – [070] of the Detailed Description discuss expressly that the workpiece is fully machined in a single pass.

With regards to the Applicant's use of the term "substantially" the MPEP states unequivocally that this is a broad term. See MPEP 2175.03(b)(D).

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[2] Claim 76 recites, "ensuring contact and *complete machining* of the edge surface ..." (emphasis added).

> The term "substantially" is often used in conjunction with another term to describe a particular characteristic of the claimed invention. It is a broad term. *In re Nehrenberg*, 280 F.2d 161, 126 USPQ 383 (CCPA 1960).

Nothing in the Applicant's disclosure indicates a limit to the breadth of this term. The Official Action at the Examiner's NOTE on page 7 supports the limiting of this term by the following interpretation of the same paragraph [020]: "... paragraph 20, as cited by the applicant, states that edges are machined, but does not further disclose that all of or even that any specific amount of the edges are actually machined." If it is true that the Applicant does not disclose "any specific" amount, than the Examiner's argument in fact supports the Applicant's contention that the word "all" in the specification should mean "all" and not merely a portion of "all" of the cut surfaces and cut edges of the workpiece. To be clear, Applicant's paragraph [020] states that, "the brush .... removes the oxide layer at all cut surfaces and cut edges." Similarly, paragraphs [069] – [070] of the Detailed Description, last line, recite that the workpiece is "fully machined" in a single pass.

The Applicant respectfully asserts that the disclosure, as read expressly and in the context of the Drawings, Background, Summary and Detailed Description of the invention clearly and unequivocally discloses removal of substantially all the oxide layer from the cut surfaces and edges of the metal workpiece.

From MPEP 2111.01, "during examination, the claims must be interpreted as broadly as their terms reasonably allow." *In re American Academy of Science Tech Center*, 367 F.3d 1359, 1369, 70 USPQ2d 1827, 1834 (Fed. Cir. 2004); *In re Zletz*, 893 F.2d 319, 321, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989). The scope of the invention is determined according to the ordinary and customary meaning of the claim terms and it is this intrinsic evidence that is the most significant source of the legally operative meaning of the claim language. *See Vitronics Corp. v.*

Conceptronic, Inc., 90 F.3d 1576, 1582 (Fed. Cir. 1996), cit. omit. Claim terms will be given their ordinary and customary meaning, unless the inventor appeared to use such words differently. See *Brookhill-Wilk 1, LLC v. Intuitive Surgical, Inc.*, 326 F.3d 1215, 1220 (Fed. Cir. 2003); *Allen Engineering Corp.*, 299 F.3d 1336, 1344 (Fed. Cir. 2002).

Also, the Final Office Action indicates at paragraph 11, last sentence that "... there is no sufficient support that substantially all of the edge surface is machined by each pair of the first and second conveyor devices, and the third and fourth conveyor devices." As best this argument is understood the Examiner is complaining that there is insufficient disclosure to show that the initial pair, i.e., the first and second conveyor devices, can machine "substantially all" of a cut or edge surface, nor that the second pair, i.e., the third and fourth conveyor devices, is thusly disclosed. However the entire disclosure is actually devoted to this proposition, for example at paragraph [023] of the Applicant's disclosure it is quite clear that it takes a pair of conveyor devices to machine the workpiece:

> [023] As a result, both main surfaces of the workpiece are particularly advantageously machined by a single operation. Moreover, the cut edges and the cut surfaces are machined from both sides, resulting in particularly thorough descaling. The use of two conveyor devices allows the workpiece to be machined quickly and economically.

The Applicant's position is that the claim phrase, "substantially all the edge surface of the workpiece" is to be given its complete breadth as indicated in the specification and that the term "substantially all" is given its complete and reasonable breadth with respect to covering all, and even mostly all, of the edge surfaces of the workpiece. The language of Claim 39 therefore complies with the written description requirement and the claim rejection under 35 USC § 112, first paragraph is made in error.

II. No Rejection under 35 U.S.C. § 112 ¶1 of Independent Claim 46

Interestingly, the next independent claim in the application, Claim 46, is not rejected under 35 U.S.C. § 112, first paragraph. The last paragraph of Claim 46 includes a similar limitation with respect to the conveyors machining "substantially all" of the cut sides and edges of the workpiece

> "...wherein the at least one brush of each of the first and second conveyor devices machine the edge surface of the workpiece in opposite directions to ensure that *substantially all* the edge surface of the workpiece is machined" [Emphasis Added].

Since a rejection is made with respect to the independent Claims 39, 76, 78 and 80, the Applicant fails to understand the rationale behind not including independent Claim 46 in the written description rejection. Assuming *arguendo* that such a rejection was made with regards to Claim 46, the Applicant believes that because of the similar claim language such a rejection is made in error for the same reasons as set forth above with regards to Claim 39 and which for purposes of brevity are not repeated.

III. Rejection under 35 U.S.C. § 112 ¶1 of Independent Claim 76

Turning to the first method claim, independent Claim 76 includes the step of "ensuring contact and *complete machining* of the edge surface between the at least one brush (3) of the first, the second, the third and the fourth conveyor devices (2, 2, 2, 2) along the entire respective first and second edge surface of the workpiece" [Emphasis Added]. Here it is intended that the claim language encompass not just machining "substantially all" the edge surface of the metal workpiece, but the entire or complete, i.e. "all", of the entirety of the side edge.

Again, the entire purpose of the apparatus, whether the machine or method includes two or four conveyors, is to ensure complete machining of the workpiece in one pass as it proceeds through the machine. The complete machining of the side edge and cut edges of the workpiece is expressly supported in the specification at least at paragraph [020]:

> [020] The inventor has discovered that, surprisingly, the linear profile of the brush in the region of the workpiece to be machined ensures that the brush penetrates into *all* cutouts or holes in the workpiece and therefore removes the oxide layer *at all* cut surfaces and cut edges. [Emphasis Added]

The Examiner's apparent interpretation of paragraph [020] would read "... the brush penetrates into all cutouts or holes in the workpiece and therefore removes the oxide layer at *only a portion of* all cut surfaces and cut edges. This is in fact reading limitations into the specification, and hence the claims, that are simply not there. It is clear that case law prohibits the reading of limitations from the specification into the claims. *Sjolund v. Musland*, 847 F.2d 1573, 1581, 6 USPQ2d 2020, 2027 (Fed. Cir. 1988), "[W]hile ... claims are to be interpreted *in light of* the specification and with a view to ascertaining the invention, it does not follow that limitations from the specification may be **read** into the claims ...." [Emphasis in original]

To compound this by reading limitations into the specification that are not there and then extrapolating such limitations to the claims is rather inconceivable. This is not only inappropriate, but entirely counterintuitive. For example, imagine a plate of just baked, warm cookies on the kitchen counter with one cookie conspicuously missing. Upon questioning, your child tells you "I ate the cookie." Understanding that there may be a few telltale crumbs, our inherent assumption is that he ate "all" of the whole, complete, entire cookie, not a portion of the cookie. Had he only eaten part of the cookie he would undoubtedly confess that "I ate part of the

cookie." At a point later on in the child's life, he informs us "I crashed the car." Cleary the whole, "all" of the car was crashed. It would be somewhat preposterous to assume that even an adolescent would say "I crashed part of the car." While we may have some questions as to the extent of the damage, we can certainly assume that the whole or "all" of the car was crashed. The point is, that where we complete, or finish, and even substantially complete or finish, an action we do not often express this with modifiers to the nouns and there is no reason to read such modifiers onto the nouns as a limitation as the Examiner has done with regards to the Applicant's disclosure and claims.

Paragraph 12 of the Final Office Action states that "[h]owever, there is no support in the original application that at least one brush on all of the first through fourth conveyor devices contact and machine the entire edge surface of the workpiece." We have discussed the matter of the "entire" "complete" or "whole" edge surface above. If what is asserted here by the Examiner is that there is no disclosure of "a single" brush on the conveyors contacting the "entire" edge surface, we point out that the Examiner's interpretation of Claim 76 in paragraph 12 is not what is recited in the claim by the Applicant. Claim 76 actually recites "ensuring contact and complete machining of the edge surface *between* the at least one brush (3) of the first, the second, the third and the fourth conveyor devices (2, 2, 2, 2) along the entire respective first and second edge surface of the workpiece" [Emphasis Added]. Even a cursory sentence structure analysis shows that these claimed steps include coverage of the entire edge surface by the brushes of the first through fourth conveyors to ensure "complete machining" of the edge surface.

It is therefore the Applicant's position that there is the necessary fundamental support in the specification for "complete machining" of the edge surface as recited in Claim 76, and

further that the claim analysis in the Official Action misconstrues the Applicant's specifically claimed subject matter.

IV. Rejection under 35 U.S.C. § 112 ¶1 of Independent Claim 78

Claim 78 and dependent Claim 79 are apparatus claims directed to an apparatus for machining a workpiece. Claim 78 recites in part:

> ... the first and second conveyor devices (2,2) rotate in opposite directions and are positioned for respectively treating the first and second main edge surface of the workpiece (1); and
>
> the first and second conveyor devices (2, 2) both rotate so as to guide the brushes (3) along an entirety of the first and second main edge surface of the workpiece.

The Examiner again makes the argument that the specification does not support the entirety of the edge surface being machined.

> Claim 78 contains the limitation that the first and second conveyor devices guide the brushes along an entirety of the edge surface of the workpiece. However, there is no support in the original application that brushes are guided along the entire edge surface of the workpiece. At most, the original specification supports that the edge surface is machined but there is no sufficient support that the entire edge surface is machined.

For the same reasons and rationale as provided with respect to independent Claims 39 and 76, the Applicant believes there is sufficient support in the present specification to support such a limitation. Although the word "entirety" is not expressly stated in the disclosure, the specification is believed to expressly support such language where not only is it the stated

purpose of the claimed apparatus to completely machine the workpiece in a single pass, but also that all of the edge surfaces of the workpiece are included in the machining.

V. Rejection under 35 U.S.C. § 112 ¶1 of Independent Claim 80

Claim 80 and dependent Claims 81 and 82 are also apparatus claims directed to an apparatus for machining a workpiece. Claim 80 recites in part that the brushes contact the edge surface and so "fully machine" the side edge surface. Again, it is the express intention of the present invention that the side edge surfaces of the workpiece and any edge surfaces of any holes, apertures or cut-outs in the workpiece are machined. In Claim 80 the claim has been limited to the edge surface being fully machined.

The Examiner again makes the argument that the specification does not support the edge surface being "fully" machined.

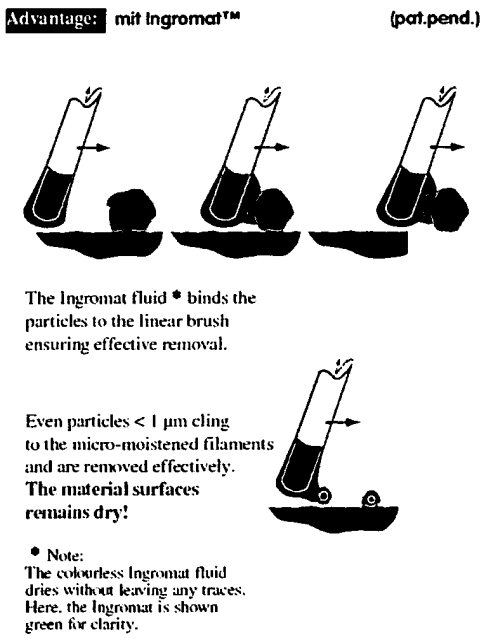
> Claim 80 contains the limitation that the side edge surface is fully machined. However, there is no support in the original application that the edge surface is fully machined. At most, the original specification supports that the edge surface is machined but there is no sufficient support that the entire edge surface is machined.

For the same reasons and rationale as provided with respect to Claims 39, 76 and 78, above, the Applicant believes there is sufficient support in the present specification to support such a limitation. Although the word "fully" is not expressly stated in the disclosure, the specification is believed to expressly support such language where not only is it the stated purpose of the claimed apparatus to completely machine the workpiece in a single pass, but also that all of the edge surfaces of the workpiece are included in the machining.

B. THE REJECTIONS OF CLAIMS 39-44, 46, 48-50, 52, 55-61, 63, 71-76 and 78-84 UNDER 35 U.S.C. § 103(a), AS OBVIOUS OVER THE INGROMAT REFERENCE ARE IN ERROR BECAUSE THE INGROMAT REFENCE FAILS ALONE OR IN COMBINATION TO DICLOSE THE PRESENTLY CLAIMED INVENTION.

VI. The Ingromat Reference

With respect to the Ingromat reference, as shown in attached Ingromat reference document, Ingromat discloses a device for cleaning a top and bottom surface of a workpiece, not for "machining" or "working," e.g., removing scale or an oxide layer from a workpiece, much less the side edges of the workpiece. This distinction is of fundamental importance because Ingromat does not desire, or need to machine, work or disturb the actual workpiece itself, other than to lift dust, or other surface contaminants and micro-particles off the workpiece. In many instances, Ingromat's device does not even contact the surface of the workpiece, but merely sweeps or draws away the surface dust and contaminants using a liquid cleaner on a brush without physically touching the workpiece material.



As shown, Ingromat uses one or more conveyor devices with brushes mounted to pass over a work surface and remove micro-particles from that surface to prepare the workpiece for further finishing, such as; silicon wafers to be used as integrated circuits, or newly manufactured car parts that are then painted and surface treated. These devices use an electro-static fluid to wet the brushes as seen in the figures below, the wet brushes are then passed over the surface of the workpiece and

micro-particles are pulled from the surface and adhered to the brushes, leaving the workpiece dry and intact; the optimal objective for the cleaning process in these types of manufacturing applications. This is an entirely different process from "machining" of a surface as claimed in the present application.

The Examiner argues at page 11 in the Final Official Action that:

> It would have been obvious that the brushes and conveyor devices, as disclosed in the Ingromat reference, being adjustable with respect to the workpiece to adjust contact pressure between the brushes and the workpiece, may be capable of removing at least a portion of an oxide layer from a surface of a workpiece over a given amount of time or treating the surface by cleaning debris off of the surface, which may be considered "machining" in the broadest reasonable interpretation of the term.

The Applicant respectfully disagrees. The word "machining" refers to a very well known series of specific metal working process and is defined in Wikipedia as follows:

> Machining is a collection of material working processes that involve using power driven machine tools, such as lathes, milling machines, and drill presses, to shape metal or plastic by removing excess material.

The objective of leaving the surface clean, intact and undisturbed in Ingromat is fundamentally and entirely structurally and functionally different than either Herrington `413 or Applicant's disclosure wherein each brush of the conveyor device is intended to uniformly machine, grind or work the surface of the workpiece, thereby removing an oxide layer and/or other imperfections such as burrs. This feature of contacting, working and transforming the surface of a material is clearly different from the wet brush cleaning system of Ingromat for cleaning without disturbing or modifying in any manner the underlying material.

VII. Rejection under 35 U.S.C. § 103(a) of Independent Claims 39, 46 and 78

Independent Claims 39, 46 and 78, and dependent Claims 38-42, 48-50, 57-61, 63 and 71-74 (all of which depend directly or indirectly from Claim 39) have been rejected as obvious over Ingromat, or in the alternative, as obvious over Ingromat in view of Herrington '413. While this discussion is directed to the independent claims, the arguments apply also to the dependent claims, which necessarily contain all of the limitations of the parent claims.

a. Independent Claim 39

Claim 39 recites "[a]n apparatus for machining a metallic workpiece" in the preamble. Again, Ingromat does not disclose, teach or suggest any machine or device for machining a workpiece, metal, plastic or otherwise, merely cleaning it. Nor does Ingromat disclose, teach or suggest "... removing an oxide layer from a surface, grinding a surface or an edge and treating or deburring a surface or edge of at least one of the first and the second main surfaces of the workpiece" as also recited in pending Claim 39. Since Ingromat does not disclose, teach or suggest at least the claimed feature of "machining" or "grinding" the workpiece, either expressly or inherently, the Applicant believes Claim 39 to be allowable.

It is almost inconceivable that such a gentle, non-invasive cleaning process disclosed by Ingromat could remove an oxidation layer no matter how much time is allotted for the workpiece to pass through the Ingromat cleaner. More to the point, it is not even considered in Ingromat that the brushes do anything more than wipe across the surface of the workpiece. In the Appendices, the Applicant has attached an Ingromat advertisement which discusses the preference of the Ingromat cleaner brushes to be used in conjunction with a "Tornado Channel" to clean debris from holes and grooves in a workpiece. The compressed air cleaning process using the "Tornado Channel" device is necessary because the "Sword Brush" brushes of

Ingromat merely wipe the surface of the workpiece and are not intended to enter into and clean holes, apertures, cut-outs and their respective side edges in the workpiece. This interpretation of Ingromat is supported by the fact that the advertisement discloses using the compressed air to remove particles within bore holes, and subsequently wiping these particles from the surfaces using the Sword Brush. In this regard, there is nothing in the Ingromat reference which contemplates the brushes being capable of cleaning, much less machining the side edges of holes and grooves in the workpiece. In fact, the use of the Tornado Channel teaches *away from* any adjustment of the brushes to a point where the brushes could conceivably enter into the holes, apertures or cut-outs of the workpiece.

With respect to the obviousness rejection in view of the combination of Ingromat with Herrington `413, these references are entirely different. As noted above, where Ingromat provides for merely for cleaning a surface without structurally working the workpiece, Herrington `413 is, like the Applicant's invention, intended to machine or work the surface of the workpiece to remove scale, for example oxidation or rust on the workpiece. These are entirely and fundamentally different devices and functions, as machining changes the structural characteristics of a metal surface, and cleaning merely cleans the surface.

The Official Action notes that:

> Herrington further discloses specific bristle material for the brushes that is capable of removing the oxide layer .... Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the Ingromat apparatus with brushes having the bristles disclosed by Herrington to allow the Ingromat apparatus to remove oxide layers from a large area of both the first and second main surfaces of a workpiece ....

The Applicant strongly disagrees. Herrington `413 discloses using wire fibers 52 as seen in FIG. 5 and then working, i.e., machining the surface of the material. By replacing the brushes on Ingromat with metallic fibers or bristles that would engage with and mar the surface of the workpiece, this would destroy the material to be cleaned in Ingromat both structurally and functionally based on the disclosure and teachings of Ingromat. In fact, the fundamental differences between "cleaning" and "machining" in these references teaches away from any such combination because the process of "machining" as arguably done by Herrington `413, actually produces waste and particulate matter that now must be removed by some secondary type of cleaning process. In this way it might be arguable that the references could be combined so that the particulate produced by the machining operation was subsequently cleaned by the Ingromat device. But this would place these apparatus and process adjacent one another, and not in fact combined as a single apparatus and process as in the Applicant's invention. Therefore, the only basis for such a combination as asserted by the Examiner is based merely on conjecture and hindsight and not by any teaching in the combined references or prior art.

In any event, even if the Ingromat and Herrington `413 references can be combined, and the Applicant adamantly disagrees that such a combination is either reasonable or feasible, neither of the references either alone or in combination disclose, teach or suggest an apparatus with opposing conveyor brushes which machine any, substantially all, or the entire edge surface of the workpiece as recited in Claim 39;

> ... wherein the at least one brush of each of the first and second conveyor devices machine substantially all the edge surface of the workpiece in opposite directions, and the at least one brush of each of the third and fourth conveyor devices machine substantially all the edge surface of the workpiece in opposite directions.

Ingromat does not teach, disclose or reveal any sort of cleaning with brushes the side surfaces of the workpiece. A thorough review of Herrington `413 also fails to reveal any such working, machining or descaling of the side surfaces of the strip or plate workpiece. Herrington `413 only relates to cleaning the top and bottom surface of the strip workpiece, "[f]or example, if the stock is in sheet or strip form the top and bottom surfaces may be simultaneously cleaned by an apparatus generally similar to the one shown or the bottom surface may be cleaned at another station in the production line." Herrington `413, cols. 4-5, ll. 73-2.

In light of the Applicant's above arguments and the currently pending Claim 39 of the present invention, it is respectfully requested that the 35 U.S.C. § 103(a) rejections of Claim 39 be withdrawn. With respect to dependent claims 40-42, 48-50, 57-61, 63 and 71-74, as these claims depend from Claim 39 either directly or indirectly such claims are now also believed allowable for at least the same reasons as Claim 39, and thus no further discussion is provided.

b. Independent Claim 46

Claim 46 is also rejected under 35 U.S.C. § 103(a) for the same or similar reasons as Claim 39, and the Applicant hereby reasserts the above arguments regarding the rejection as applied against Claim 39. Whether or not these references can be combined, neither of the references either alone or in combination disclose, teach or discuss any sort of device capable of machining substantially all of the edge surface of the workpiece. The Applicant strongly disagrees that Ingromat discloses any sort of "machining" operation as the Examiner asserts at paragraph 21 of the Final Official Action. Even if Ingromat could conceivably be combined with the Herrington `413 reference, there is still no teaching or disclosure that substantially all the side edges and cut edges in the workpiece would be machined.

In view of the above, it is respectfully requested that the 35 U.S.C. § 103(a) rejection of Claim 46 be withdrawn.

c. Independent Claim 78

Next, Claim 78 is also rejected under 35 U.S.C. § 103(a) in view of Ingromat or alternatively Ingromat in view of Herrington `413 because "... the first and second conveyor devices are both either inherently capable of or would obviously be modified to rotate so as to treat the edge surface of the workpiece, as discussed supra." The first question then is whether it would be "inherent" to modify Ingromat to accomplish the machining of the edge surfaces of a workpiece. The brushes as disclosed in Ingromat are arguably adjustable relative to one another on each side of the workpiece to accommodate different thicknesses of workpieces. However, does the possibility that the brushes could be arranged to provide coverage of the side edges make it inherent? We think not.

Inherency is necessarily a matter of subjective belief. Patent claims (or limitations thereof) should be held anticipated or obvious under principles of inherency only when the inherency is truly inevitable. Inevitability is inextricably bound up with the prior art's disclosure and teaching. To establish that one of ordinary skill in the art would have inevitably produced the Applicant's claimed invention, the prior art must satisfy a heightened level of enablement. Whatever teaching was explicitly provided by Ingromat, be it instructions, examples, or other guidance, such teaching must be so clear that when replicated, no more than de minimis experimentation is required to obtain the claimed invention, i.e., to put the public in possession of that invention. From MPEP 2112 IV:

> In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the

> allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." *Ex parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990) (emphasis in original) (Applicant's invention was directed to a biaxially oriented, flexible dilation catheter balloon (a tube which expands upon inflation) used, for example, in clearing the blood vessels of heart patients). The examiner applied a U.S. patent to Schjeldahl which disclosed injection molding a tubular preform and then injecting air into the preform to expand it against a mold (blow molding). The reference did not directly state that the end product balloon was biaxially oriented. It did disclose that the balloon was "formed from a thin flexible inelastic, high tensile strength, biaxially oriented synthetic plastic material." Id. at 1462 (emphasis in original). The examiner argued that Schjeldahl's balloon was inherently biaxially oriented. The Board reversed on the basis that the examiner did not provide objective evidence or cogent technical reasoning to support the conclusion of inherency.

The disclosure of Ingromat reveals nothing in regards to machining, mechanically transforming, treating or cleaning for that matter, the side edges of a workpiece. In the Ingromat disclosure the brush filaments are expressly described as intended to "skim" the surface of the material to remove particles. According to the disclosure of Ingromat, this by itself, without the Ingromat electro-static fluid is ineffective to remove particles. Ingromat does not adjust the brush filaments to achieve any more contact or sweeping action of the brush filaments, because this would in fact potentially damage the underlying material which the brushes are cleaning. Ingromat adds a film of fluid to obtain the benefit of capillary action in capturing particles which cannot be captured by just a dry brush sweeping action. There is no adjustment of the "skim" action of the brushes whatsoever.

As best the Applicant understands the inherency argument, it lies in the nature of, for instance, sweeping out the garage, where a stubborn deposit of dirt or grime would merely cause

one to push down harder on the broom in an attempt to remove the unwanted deposit. But this alleged inherency is quite the opposite of the smarter solution apparently offered by Ingromat where more force would actually be detrimental to the underlying material, and the capillary action of the Ingromat cleaner fluid facilities a more efficient particle removal without bringing the brushes into any more vigorous contact besides "skimming" the surface of the material.

An assertion that the presently claimed invention is obvious in light of Ingromat must be generally supported by some teaching or suggestion in the reference itself which would lead one of skill in the art to undertake the claimed invention. Ingromat as noted above clearly teaches that it is the Ingromat fluid along with the bristles skimming or sweeping across the surface of the workpiece which facilitates the removal of debris. As discussed above, there is no disclosure, teaching or even a suggestion that the bristles should do anything other than "skim" across the surface of the workpiece. There is no express or inherent disclosure in any of the Ingromat references that would lead one of skill in the art to modify the brushes so that they machine or treat the edge surface of the workpiece as suggested by the Examiner. Therefore the Applicant respectfully requests that the obviousness rejection of Claim 78 be withdrawn.

VIII. Rejection under 35 U.S.C. § 103(a) of Dependent Claim 43

Claim 43, which ultimately depends from independent Claim 39, has been rejected as obvious over Ingromat or, alternatively, Ingromat in view of Herrington `413, and further in view of McCormick `882. The Applicant hereby reasserts the above arguments regarding the Ingromat rejection as applied against Claim 39.

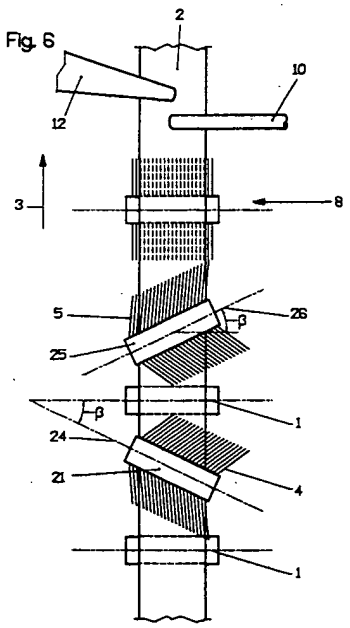
IX. Rejection under 35 U.S.C. § 103(a) of Dependent Claim 44

Claim 44, which ultimately depends from independent Claim 39, has been rejected as obvious over Ingromat or, alternatively, Ingromat in view of Herrington `413, and further in view of Derby `166. The Applicant hereby reasserts the above arguments regarding the Ingromat rejection as applied against Claim 39.

X. Rejection under 35 U.S.C. § 103(a) of Dependent Claims 52, 55, 56 and 75

Claims 52, 55, 56 and 75, which ultimately depend from independent Claim 39, have been rejected as obvious over Ingromat in view of Herrington `413. The Applicant hereby reasserts the above arguments regarding the Ingromat rejection as applied against Claim 39.

XI. Rejection under 35 U.S.C. § 103(a) Independent Claims 76 and 80



Independent Claims 76 and 80, and dependent Claims 53, 79, 81, 83 and 84 have been rejected as obvious over Ingromat or, alternatively, Ingromat in view of Herrington `413, and further in view of Lisec `716. Claim 53 depends from independent Claim 39 and Claims 83 and 84 depend from independent Claim 46. The Applicant hereby reasserts, for Claims 53, 83 and 84, the above arguments regarding the Ingromat rejection as applied against Claims 39 and 46.

With regard to independent Claims 76 and 80, the further combination of Lisec `716 is nothing less than

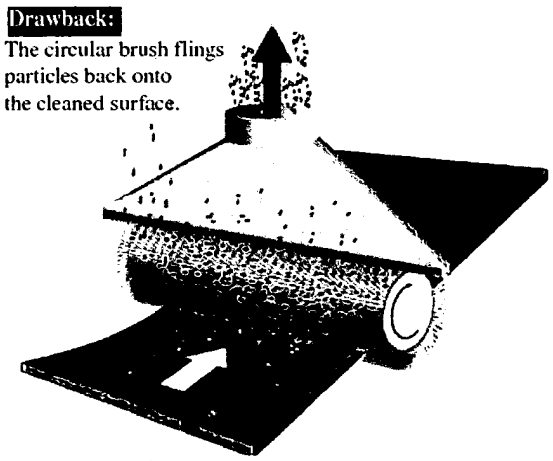
inoperable with respect to a combination with either Ingromat or Herrington `413 because Lisec `716 aligns its rollers fundamentally differently from the transverse sweeping rotation across a workpiece as used in Ingromat, Herrington `413 and even the Applicant's present invention.

As shown to the left, Lisec `716 aligns its roller's axis in parallel with the direction of travel of the workpiece, and in an angular relation with the direction of travel of the workpiece which is something less than transverse. In any event, Claim 76 specifically recites "guiding the workpiece (1) past the first, the second, the third and the fourth conveyor devices (2) transversely with respect to a direction of rotation of the first, the second, the third and the fourth conveyor devices (2) ...." Because of this arrangement, Lisec `716 cannot draw the brushes transversally across the linear width of the workpiece. This transverse relationship between the rotation of the conveyor devices of the other references as well as the present invention is important because the transverse alignment not only pulls the particulate material off the workpiece and but more importantly also ensures uniform wear of the brushes. As discussed at Applicant's specification at paragraph [019]:

> [s]ince the brush, on account of being arranged on a rotating conveyor device does not dwell rigidly at one position, but rather is guided past the entire length available for the workpiece to pass through, uniform wear to the at least one brush is ensured. The workpiece can in this case easily be guided or pulled through obliquely, preferably transversely, with respect to the direction of rotation of the brush, so that the workpiece is uniformly machined by the brush.

Additionally the transverse nature of the alignment of the present invention, Ingromat and Herrington provides for a more consistent production speed in that, as explained in the Applicant's specification at paragraph [064], the transverse running direction of the brushes easily removes dirt and debris off the material and the workpiece is not pushed or pulled, i.e.,

accelerated or decelerated in its direction of travel. Instead, there is a constant pressure in a direction transverse to the direction of material and the workpiece is pressed upwards and downwards into its supports. Interestingly, Ingromat's documents themselves teach away from any sort of combination with brushes aligned in the manner of Lisec `716. As seen in the figure illustrated from Ingromat's disclosure, such parallel aligned axis of rotation with the direction of the workpiece is a particular drawback because the debris falls back onto the workpiece.



It is thus the Applicant's position that the combination of Lisec `716 would be a fundamental structural change to the basic transverse brush travel of Ingromat and Herrington `413. One of ordinary skill in the art would certainly not combine Lisec `716 with these references and disturb the fundamental transverse rotational principal of these references by the addition of Lisec `716 which aligns its rotational axis and bristles in an entirely structurally and functionally different arrangement.

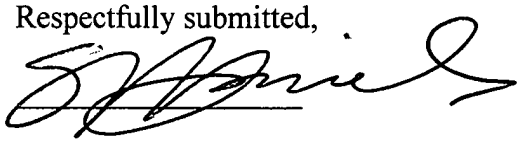
XII. Rejection under 35 U.S.C. § 103(a) of Dependent Claim 82

Claim 82, which depends from independent Claim 80, has been rejected as obvious over Ingromat in view of Lisec `716 or, alternatively, Ingromat in view of Herrington `413 and Lisec `716, and further in view of Hutchinson `397. The Applicant hereby reasserts the above arguments regarding the Ingromat rejection as applied against Claim 80.

CONCLUSION

It is the Applicant's contention, in view of the above remarks, that all of the claims in the application are now in condition for allowance. The Applicant respectfully requests that all rejections and objections to the claims be withdrawn and that the application be allowed to issue as a patent.

Respectfully submitted,



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APPENDICES

A. CLAIMS SECTION

1-38 (Canceled).

39. (Rejected) An apparatus for machining a metallic workpiece being one of strip or plate form and having first and second opposed main surfaces and extending therebetween at least an edge surface angularly disposed relative to the first and second opposed main surfaces, the apparatus performs at least one of removing an oxide layer, grinding, deburrinq and descalinq at least the edge surface of the workpiece,

wherein the apparatus comprises at least first, second, third and fourth conveyor devices (2, 2, 2, 2) and each of the first, the second, the third and the fourth conveyor devices (2, 2, 2, 2) has at least one brush (3), each of at least the first, the second, the third and the fourth conveyor devices (2, 2, 2, 2) guides the respective at least one brush (3) at least approximately linearly along the first main surface and the edge surface of the workpiece (1) to be machined transversely with respect to an advance direction of the workpiece (1), two of the conveyor devices (2,2) rotate in opposite directions and are positioned for treating at least the edge surface of the workpiece (1), the two other conveyor devices (2,2) rotate in opposite directions and are positioned for treating at least the edge surface of the workpiece (1), and the first, second, third and the fourth conveyor devices (2, 2) rotate so as to guide the brushes (3) along an entirety of a length of the apparatus available for the workpiece to pass through; and

wherein the at least one brush of each of the first and second conveyor devices machine substantially all the edge surface of the workpiece in opposite directions, and the at least one brush of each of the third and fourth conveyor devices machine substantially all the edge

surface of the workpiece in opposite directions.

40. (Rejected) The apparatus according to claim 39, wherein at least the first, the second, the third and the fourth conveyor devices (2) are arranged in a standing position, so that the at least one brush (3) of each of at least the first, the second, the third and the fourth conveyor devices (2) runs one of substantially vertically along the workpiece (1) in the standing position, or in a lying position, so that the at least one brush (3) runs substantially horizontally along the workpiece (1) in the lying position.

41. (Rejected) The apparatus according to claim 39, wherein the workpiece (1) is guided between the first and the second conveyor devices (2) such that each of the first and the second conveyor devices (2) machine one of the first and the second main surfaces (1c) of the workpiece (1).

42. (Rejected) The apparatus according to claim 41, wherein the direction of rotation of the first and the second conveyor devices (2) is selected such that the brushes (3) of the first and the second conveyor devices (2) are guided past the opposed first and the second main surfaces (1c) of the workpiece (1) in a same direction.

43. (Rejected) The apparatus according to claim 40, wherein the direction of rotation of the first and the second conveyor devices (2) arranged in the standing position is selected such that the at least one brush (3) of the at least first and the second conveyor devices (2) is guided past the workpiece (1) in one of the direction of a base plate (9), or from a top of the apparatus

downward.

44. (Rejected) The apparatus according to claim 40, wherein the direction of rotation of the first and the second conveyor devices (2) arranged in the lying position is selected such that the at least one brush (3) of the first and the second conveyor devices (2) is guided along the workpiece (1) in the direction of a delimiting plate which guides the workpiece (1) at one side.

45. (Canceled)

46. (Rejected) An apparatus for machining a metallic workpiece, being one of strip or plate form and having first and second opposed main surfaces and extending therebetween at least an edge surface angularly disposed relative to the first and second opposed main surfaces, the apparatus performs at least one of removing an oxide layer, grinding, deburring and descaling the edge surface of the workpiece,

the apparatus comprises at least first and second conveyor devices (2, 2) and each of the first and second conveyor devices (2, 2) has at least one brush (3), each of at least the first and the second conveyor devices (2, 2) guides the respective at least one brush (3) at least approximately linearly past the edge surface of the workpiece (1) to be treated;

the first and the second conveyor devices (2, 2) rotate in opposite directions and the first conveyor device (2) machines at least the edge surface of the workpiece (1) while the second conveyor device (2) machines at least the edge surface of the workpiece (1), and the first and the second conveyor devices (2) are arranged slightly offset with respect to one another in the advance direction in which the workpiece (1) passes through; and

wherein the at least one brush of each of the first and second conveyor devices machine the edge surface of the workpiece in opposite directions to ensure that substantially all the edge surface of the workpiece is machined.

47. (Canceled)

48. (Rejected) The apparatus according to claim 39, wherein each of at least the first, the second, the third and the fourth conveyor devices (2, 2, 2, 2) has a plurality of brushes (3) arranged at a spacing distance from one another.

49. (Rejected) The apparatus according to claim 39, further comprising a guide passage (4), which is set to a thickness of the workpiece (1) and by which the workpiece (1) is displaced with guidance, transversely with respect to the direction of rotation of the at least one of the first, the second, the third and the fourth conveyor devices (2).

50. (Rejected) The apparatus according to claim 41, further comprising an adjustment means for adjusting the first and the second conveyor devices (2) with respect to one another to correct for wear of the at least one brush (3).

51. (Canceled)

52. (Rejected) The apparatus according to claim 39, wherein bristles (12) of the at least one brush (3) of each of the first, the second, the third and the fourth conveyor devices

(2, 2, 2, 2) are formed as one of intertwined bristles and abrasive bristles.

53. (Rejected) The apparatus according to claim 39, wherein bristles (12) of the at least one brush (3) of each of the first, the second, the third and the fourth conveyor devices (2, 2, 2, 2) are each parallel inclined by up to 45° and a tip of each bristle is located in front of an opposite end of each respective bristle in the direction of rotation.

54. (Canceled)

55. (Rejected) The apparatus according to claim 52, wherein a bundle (120) of bristles (12) is surrounded by a stabilizing and supporting sheath (21).

56. (Rejected) The apparatus according to claim 39, wherein the at least one brush (3) or bristles (12) of the at least one brush (3) is coupled to a respective conveyor device (2) by one of a bond, a screw and a weld.

57. (Rejected) The apparatus according to claim 39, wherein the rotational speed of the at least one brush (3) is between 5 to 30 m/sec.

58. (Rejected) The apparatus according to claim 39, wherein each of the first, the second, the third and the fourth) conveyor devices (2, 2, 2, 2) has an independent drive.

59. (Rejected) The apparatus according to claim 39, wherein each of the first, the second, the third and the fourth conveyor devices (2, 2, 2, 2) is one of a V-belt (13), a toothed belt, a flat belt with studs and a chain.

60. (Rejected) The apparatus according to claim 39, wherein each of the first, the second, the third and the fourth conveyor devices (2, 2, 2, 2) is a triple V-belt (13a, 13b, 13c), with a middle V-belt (13a) accommodating the brushes (3).

61. (Rejected) The apparatus according to claim 59, wherein the V-belt (13) is formed from at least one of rubber, plastic, synthetic rubber and neoprene.

62. (Rejected) The apparatus according to claim 59, wherein the V-belt has a polyurethane covering layer (14), and a carrier (15), which is formed from one of rubber or plastic, for one of the brush (3) or bristles (12) of the brush (3), is coupled to the PU covering layer (14) by a weld.

63. (Rejected) The apparatus according to claim 59, wherein a carrier (15), which is preferably formed from one of rubber or plastic, for one of the brush (3) or bristles (12) of the brush (3) is coupled to the V-belt (13) by one of a screw, a rivet, a bond, a weld and a clip.

64. (Rejected) The apparatus according to claim 63, wherein a top side of the V-belt (13) communicates with the carrier (15), the top side having one of elevations or

protuberances (17) for one of guiding and supporting the carrier.

65. (Rejected) The apparatus according to claim 62, wherein the carrier retains the bristles (12) in bundles (120).

66. (Rejected) The apparatus according to claim 62, wherein the carrier (15 is formed from one of a plurality of individual segments (15b) or has slots (16) transverse aligned with respect to the direction of rotation of the conveyor device (2), the plurality of segments (15b) or pieces (15a) separated by the slots (16) having a length of from 10 to 40 mm.

67. (Rejected) The apparatus according to claim 66, wherein each of the segments (15b) have a groove (18) in one of a leading or trailing end and a tongue (19) in the other of a leading or trailing end, by which the segments (15b) are connected to one another.

68. (Rejected) The apparatus according to claim 66, wherein between two to four adjacent segments (15b) or adjacent pieces (15a) separated by the slots (16), have bristles (12) and together form the brush (3).

69. (Rejected) The apparatus according to claim 68, wherein between one to three adjacent bristle-free segments (15b) or pieces (15a) are arranged between the brushes (3) of a V-belt (13).

70. (Rejected) The apparatus according to claim 66, wherein each of the adjacent pieces (15a) or segments (15b) are separated by approximately 3 to 20 mm.

71. (Rejected) The apparatus as claimed claim 39, wherein a resistance element (23) is located downstream from a diversion point (22) of the conveyor device (2), as seen in the direction of rotation, before one of the brush (3) or bristles (12) resumes contact with the metallic workpiece (1).

72. (Rejected) The apparatus according to claim 71, wherein the resistance element (23) is located in a region in which the brush (3) or bristles (12) leave a circular path produced by the diversion point (22) of the conveyor device (2) and returns to one of a linear or rectilinear movement.

73. (Rejected) The apparatus according to claim 71, wherein the resistance element (23) mechanically prevents the bristles (12) from yielding in the direction of rotation.

74. (Rejected) The apparatus according to claim 73, wherein the resistance element (23) is introduced into a path of the brush (3) or bristles (12) such that tips of the bristles (12) butt against the resistance element.

75. (Rejected) The apparatus according to claim 39, wherein each of the first, the second, the third and the fourth conveyor devices (2, 2, 2, 2) is a V-belt having bristles (12), which are coupled onto a top side of the V-belt by one of a bond, a screw and a weld, either

directly or via a carrier, and the bristles (12) are inclined by up to 45° in the direction of rotation of the V-belt.

76. (Rejected) A method for machining a metallic workpiece, in strip or plate form and having first and second opposed main surfaces and extending therebetween at least an edge surface angularly disposed relative to the first and second opposed main surfaces, the method including the step of:

one of removing an oxide layer, grinding the edge surface and treating or deburring the edge surface of the workpiece, the method further comprising the steps of:

providing first, second, third and fourth conveyor devices (2) each having at least one brush (3);

operating the first, the second, the third and the fourth conveyor devices (2) such that the at least one brush (3) runs at least approximately linearly across a desired surface of the workpiece (1);

guiding the workpiece (1) past the first, the second, the third and the fourth conveyor devices (2) transversely with respect to a direction of rotation of the first, the second, the third and the fourth conveyor devices (2) the first conveyor device (2) machining a first surface of the workpiece and the edge surface and the second conveyor device (2) machining a second surface and the edge surface, the third conveyor device (2) machining the first surface and the edge surface and the fourth conveyor device (2) machining the second surface and the edge surface, the first and the third conveyor devices rotating in opposite directions and the second and the fourth conveyor devices rotating in opposite directions;

aligning the first and second conveyor devices in an offset manner along a travel direction of the workpiece on the opposite first and second sides of the workpiece and aligning the third and fourth conveyor devices in an offset manner also along the travel direction of the workpiece on the opposite first and second sides of the workpiece; and

ensuring contact and complete machining of the edge surface between the at least one brush (3) of the first, the second, the third and the fourth conveyor devices (2, 2, 2, 2) along the entire respective edge surface of the workpiece.

77. (Canceled)

78. (Rejected) An apparatus for machining a metallic workpiece, being one of strip or plate form and having first and second opposed main surfaces and extending therebetween at least an edge surface angularly disposed relative to the first and second opposed main surfaces, the apparatus performs at least one of removing an oxide layer, grinding treating and deburring the edge surface the first and the second main surfaces of the workpiece, the apparatus comprising:

a first and a second conveyor devices (2, 2) and each of the first and second conveyor devices (2, 2) has at least one brush (3) guided at least approximately linearly past a region of the workpiece (1) to be machined transversely with respect to an advance direction of the workpiece (1);

the first and second conveyor devices (2,2) rotate in opposite directions and are positioned for respectively treating the edge surface of the workpiece (1); and

the first and second conveyor devices (2, 2) both rotate so as to guide the brushes

(3) along an entirety of the edge surface of the workpiece.

79. (Rejected) The apparatus according to claim 78, wherein a plurality of bristles (12) of the at least one brush (3) of each of the first and the second conveyor devices (2, 2, 2, 2) are each parallel inclined by up to 45° and a tip of each of the plurality bristle is located in front of an opposite end of each respective bristle in the forward direction of rotation of the first and second conveyor devices.

80. (Rejected) An apparatus for machining a metallic workpiece having a strip or plate form defined by a first and second opposed main surfaces and at least a side edge surface angularly disposed relative to the first and second opposed main surfaces, the apparatus performs at least one of removing an oxide layer, grinding, treating and deburring at least substantially all the edge surface angularly disposed between the first and the second main surfaces of the workpiece, the apparatus comprising:

a first conveyor device (2) supporting at least a first brush (3);

a second conveyor device (2) supporting at least a second brush (3);

a guide passage for receiving and guiding the metallic work piece in an advancing direction between the first and second brushes of the respective first and second conveyor devices;

a region defined by the guide passage where the first and second brushes contact the metallic workpiece to the extent that at least the side edge surface is fully machined; and

wherein the first and second brush each comprise a plurality of substantially parallel aligned bristles supported in a carrier segment and each of the parallel bristles are

inclined at an angle of up to 45 degrees relative to the carrier segment.

81. (Rejected) The apparatus for machining a metallic workpiece as set forth in claim 80 wherein a tip of each parallel aligned and inclined bristle is located forward in the direction of travel of the brush relative to an end of the bristle secured in the carrier segment to facilitate machining of the side edge surface of the metallic workpiece.

82. (Rejected) The apparatus for machining a metallic workpiece as set forth in claim 81 wherein the carrier segment supporting the parallel aligned bristles comprises a groove on a first end of the carrier segment and a tongue on second end of the carrier segment by which a plurality of similar carrier segments may be connected together so as to prevent twisting of the individual segments relative to one another.

83. (Rejected) The apparatus according to claim 46, wherein bristles (12) of the at least one brush (3) of each of the first and the second conveyor devices (2, 2) are each parallel inclined by up to 45° and a tip of each bristle is located in front of an opposite end of each respective bristle in the direction of rotation.

84. (Rejected) The apparatus according to claim 83, wherein the bristles (12) of the at least one brush (3) of each of the first and the second conveyor devices (2, 2) are each parallel inclined at about 15° and the tip of each bristle is located in front of the opposite end of each respective bristle in the direction of rotation.

85. (Rejected) The apparatus according to claim 53, wherein the bristles (12) of the at least one brush (3) of each of the first, second, third and fourth conveyor devices (2, 2, 2, 2) are each parallel inclined at about 15° and the tip of each bristle is located in front of the opposite end of each respective bristle in the direction of rotation.

86. (Withdrawn) A carrier segment for use as a component of a brush for an apparatus for machining a metallic workpiece, the apparatus having at least a first and a second conveyor each having at least one brush for undertaking one of removing an oxide layer, grinding, treating and deburring at least one of a first and second main surfaces of the metallic workpiece and an edge surface angularly disposed between the first and second main surfaces, the carrier segment comprising:

a base supporting a plurality of bristles forming the brush; and

wherein the plurality of bristles (12) supported in the base of the carrier segment are each parallel inclined by up to 45° relative to the base of the carrier segment.

87. (Withdrawn) The carrier segment according to claim 86, wherein the plurality of bristles supported by the brush (3) of each of the at least first and second conveyor devices (2, 2) are each parallel inclined at about 15°.

88. (Withdrawn) The carrier segment according to claim 86 wherein a tip of each parallel aligned and inclined bristle is located forward in the direction of travel of the brush relative to an end of the bristle secured in the carrier segment to facilitate machining of the side edge surface of the metallic workpiece.

89. (Withdrawn) The carrier segment according to claim 86 wherein the carrier segment supporting the parallel aligned bristles comprises a groove on a first end of the carrier segment and a tongue on second end of the carrier segment by which a plurality of similar carrier segments may be connected together so as to prevent twisting of the individual segments relative to one another.

B. RELATED PROCEEDINGS

Below is a copy of the response to the Pre-Appeal Brief Request for Review:

Notice of Panel Decision from Pre-Appeal Brief Review	**Application/Control No.** 10/533,108	**Applicant(s)/Patent under Reexamination** WEILAND, JOSEF
	BRYAN R. MULLER	**Art Unit** 3727

This is in response to the Pre-Appeal Brief Request for Review filed 3 August 2009.

1. ☐ **Improper Request** – The Request is improper and a conference will not be held for the following reason(s):

☐ The Notice of Appeal has not been filed concurrent with the Pre-Appeal Brief Request.
☐ The request does not include reasons why a review is appropriate.
☐ A proposed amendment is included with the Pre-Appeal Brief request.
☐ Other:

The time period for filing a response continues to run from the receipt date of the Notice of Appeal or from the mail date of the last Office communication, if no Notice of Appeal has been received.

2. ☒ **Proceed to Board of Patent Appeals and Interferences** – A Pre-Appeal Brief conference has been held. The application remains under appeal because there is at least one actual issue for appeal. Applicant is required to submit an appeal brief in accordance with 37 CFR 41.37. The time period for filing an appeal brief will be reset to be one month from mailing this decision, or the balance of the two-month time period running from the receipt of the notice of appeal, whichever is greater. Further, the time period for filing of the appeal brief is extendible under 37 CFR 1.136 based upon the mail date of this decision or the receipt date of the notice of appeal, as applicable.

☒ The panel has determined the status of the claim(s) is as follows:
Claim(s) allowed: _____.
Claim(s) objected to: *62, 65-70*.
Claim(s) rejected: *39-44, 46, 48-50, 52, 53, 55-61, 63, 64, 71-76, 78-85*.
Claim(s) withdrawn from consideration: *86-89*.

3. ☐ **Allowable application** – A conference has been held. The rejection is withdrawn and a Notice of Allowance will be mailed. Prosecution on the merits remains closed. No further action is required by applicant at this time.

4. ☐ **Reopen Prosecution** – A conference has been held. The rejection is withdrawn and a new Office action will be mailed. No further action is required by applicant at this time.

All participants:

(1) *BRYAN R. MULLER*. (3)*MONICA CARTER*.

(2) *GREG VIDOVICH*. (4)_____.

/Bryan R Muller/	/Monica S. Carter/	/Greg Vidovich/
Primary Examiner, Art Unit 3727	Supervisory Patent Examiner, Art Unit 3727	TQAS, TC 3700

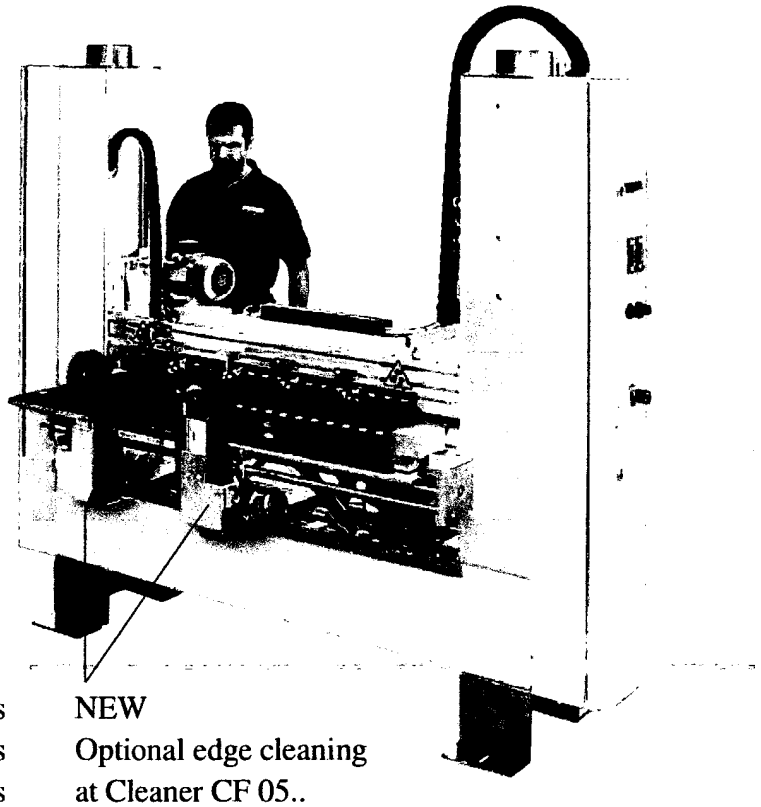
U.S. Patent and Trademark Office Part of Paper No. 20090826

C. INGROMAT REFERENCE

micro-cleaning for your products

Ingromat™-Cleaner CF 05..

Micro-cleaning of flat surfaces



Laminates
Plastic boards
Panels
Flat glass
Printed circuits
Paper, foils
Stainless steel
Aluminium
etc.

NEW
Optional edge cleaning at Cleaner CF 05..

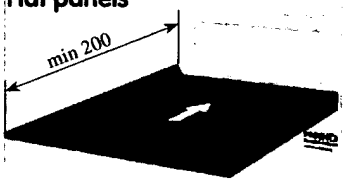
26.7.2005 (4)

WANDRES
micro-cleaning

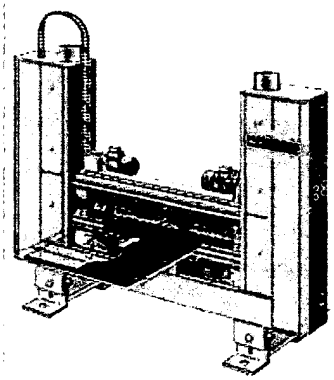
www.wandres.com

C O N T E N T

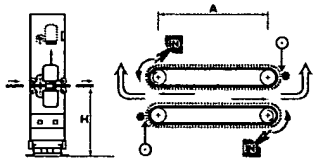
Flat panels



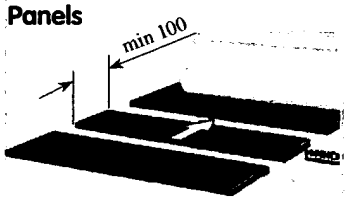
see page 10



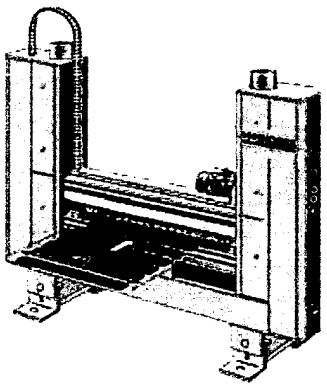
Ingromat-Cleaner CF 05/A
Cleaning module BIT 140/3/A
with electrical height adjustment
Ingromat-Cleaner CM 05/A
Cleaning module BIT 140/3/A
without electrical height adjustment



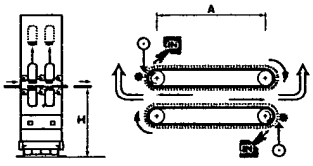
Panels



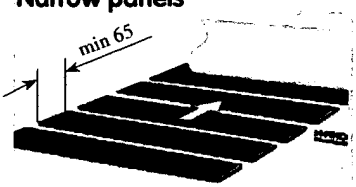
see page 12



Sword Brush Cleaner CF 05/A
Cleaning module BIQ 246/3/A



Narrow panels



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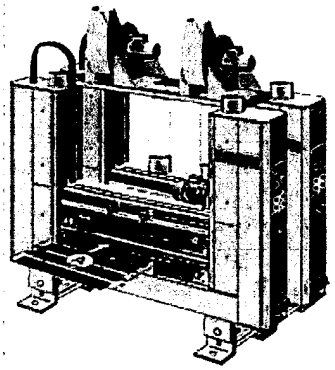
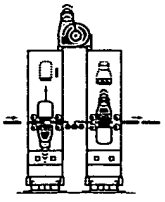
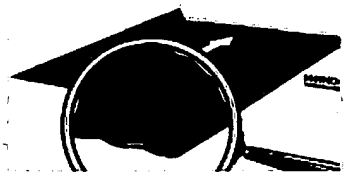


with vacuum roller conveyor
Ingromat-Cleaner CVT 05/A
Cleaning module BIT 140/1/A
Ingromat-Cleaner CVB 05/A
Cleaning module BIT 140/1/A

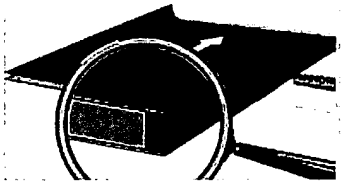


Rippled

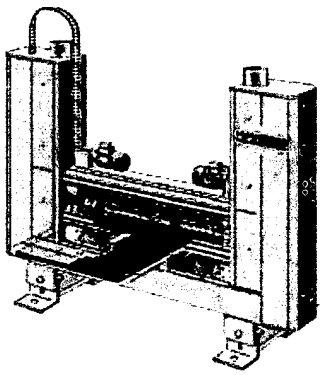


Sagging

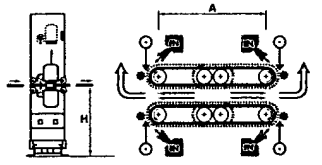
Projecting



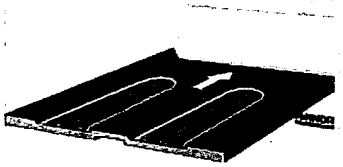
see page 16



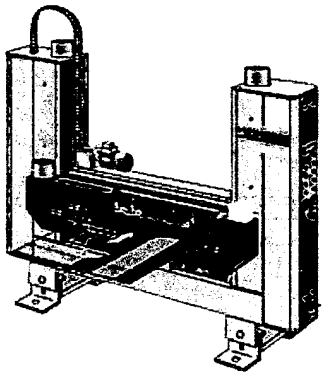
Ingromat-Cleaner CF 05/A
Cleaning module BIT 140/4/A



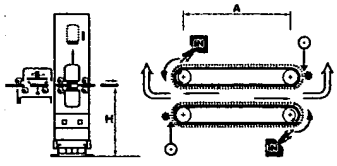
Recessed



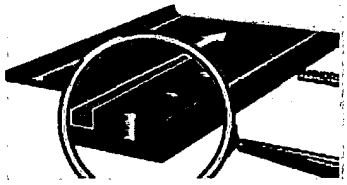
see page 18



Ingromat-Cleaner CF 05/A
Cleaning module BIT 140/3/A
Tornado-Channel TKR 04/2



Slotted and drilled



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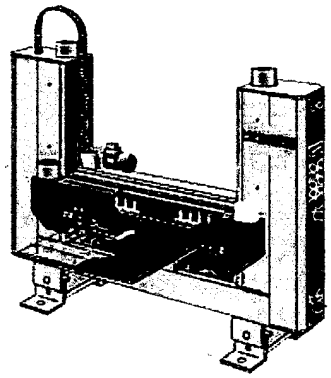
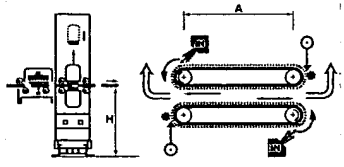


Ingromat-Cleaner CF 05/A
Cleaning module BIT 140/3/A
Tornado-Channel TKF 04/2



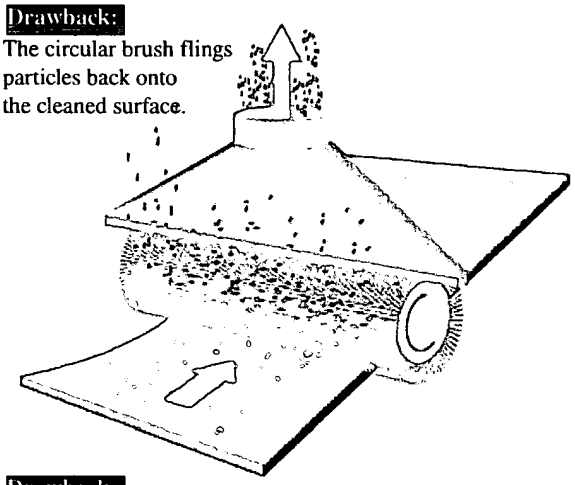
C O N T E N T

C O N T E N T

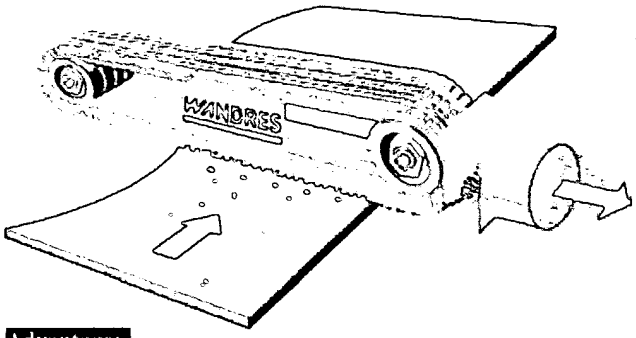
Previous standard

WANDRES technology
What makes us different?

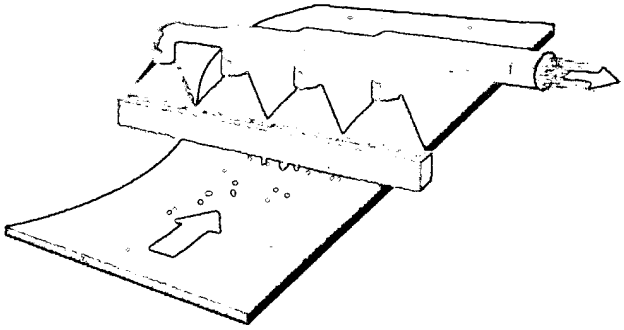
Drawback:
The circular brush flings particles back onto the cleaned surface.



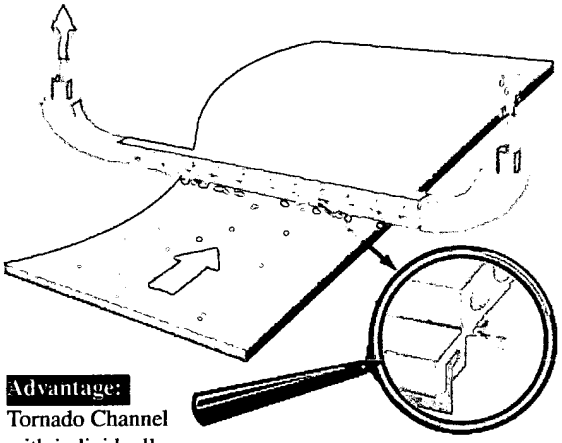
Advantage:
Clean surfaces stay clean.
Concentrated suction at the edge of the material reduces the power requirement.



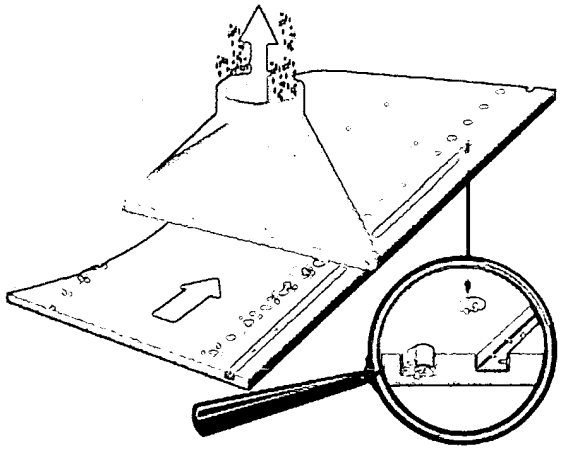
Drawback:
Despite a substantial suction, the flow velocity at the surface remains low (< 25 m/s).



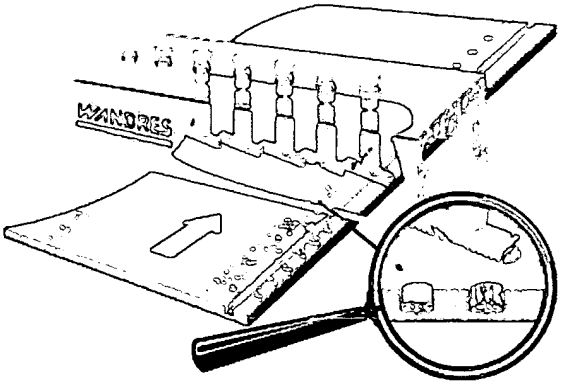
Advantage:
Compressed air operated nozzles (High Speed Channel) produce an effective cross flow (> 100 m/s).



Drawback:
Blind holes cannot be cleaned.

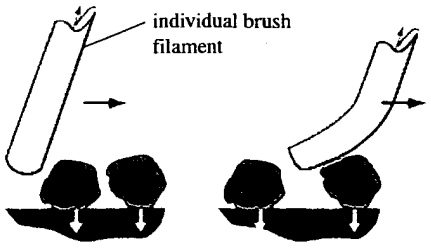


Advantage:
Tornado Channel with individually controllable Power Nozzles cleans any form of recess effectively.

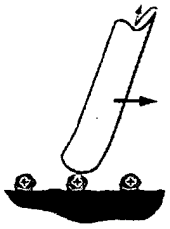


Previous standard dry...

Drawback: (conventional method)

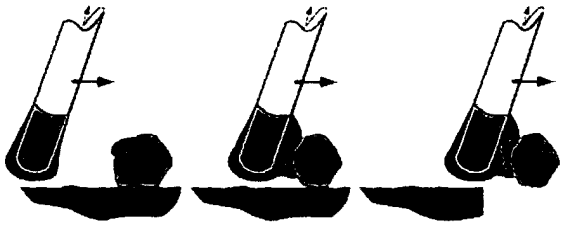


The dry brush filaments skim over the surface. Small particles are not effectively removed.



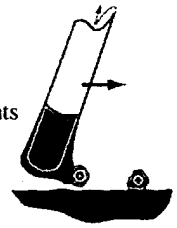
WANDRES innovation or mirco-moistened Ingromat process

Advantage: mit Ingromat™ (pat.pend.)



The Ingromat fluid * binds the particles to the linear brush ensuring effective removal.

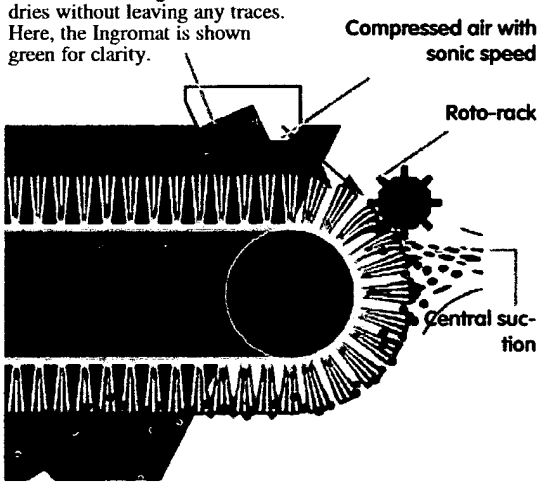
Even particles < 1 µm cling to the micro-moistened filaments and are removed effectively. **The material surfaces remains dry!**



* Note:
The colourless Ingromat fluid dries without leaving any traces. Here, the Ingromat is shown green for clarity.

without Ingromat:
Only larger particles are removed effectively.
with Ingromat:
Even the smallest micro-particles cling to and are removed by the moistened linear brushes.

Ingromat Sprayer
The colourless Ingromat fluid dries without leaving any traces. Here, the Ingromat is shown green for clarity.



Ingromat™-linear brushes moistened with Ingromat™ attract dust particles strongly (capillary attraction). Electric charges are considerably reduced.

see animation
www.wandres.com

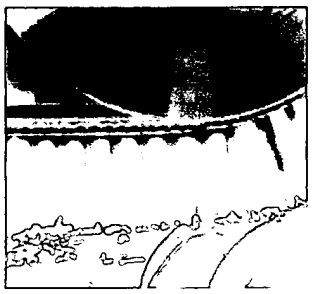
WANDRES™ Ingromat-Cleaner Function and description

High-Speed-Channel

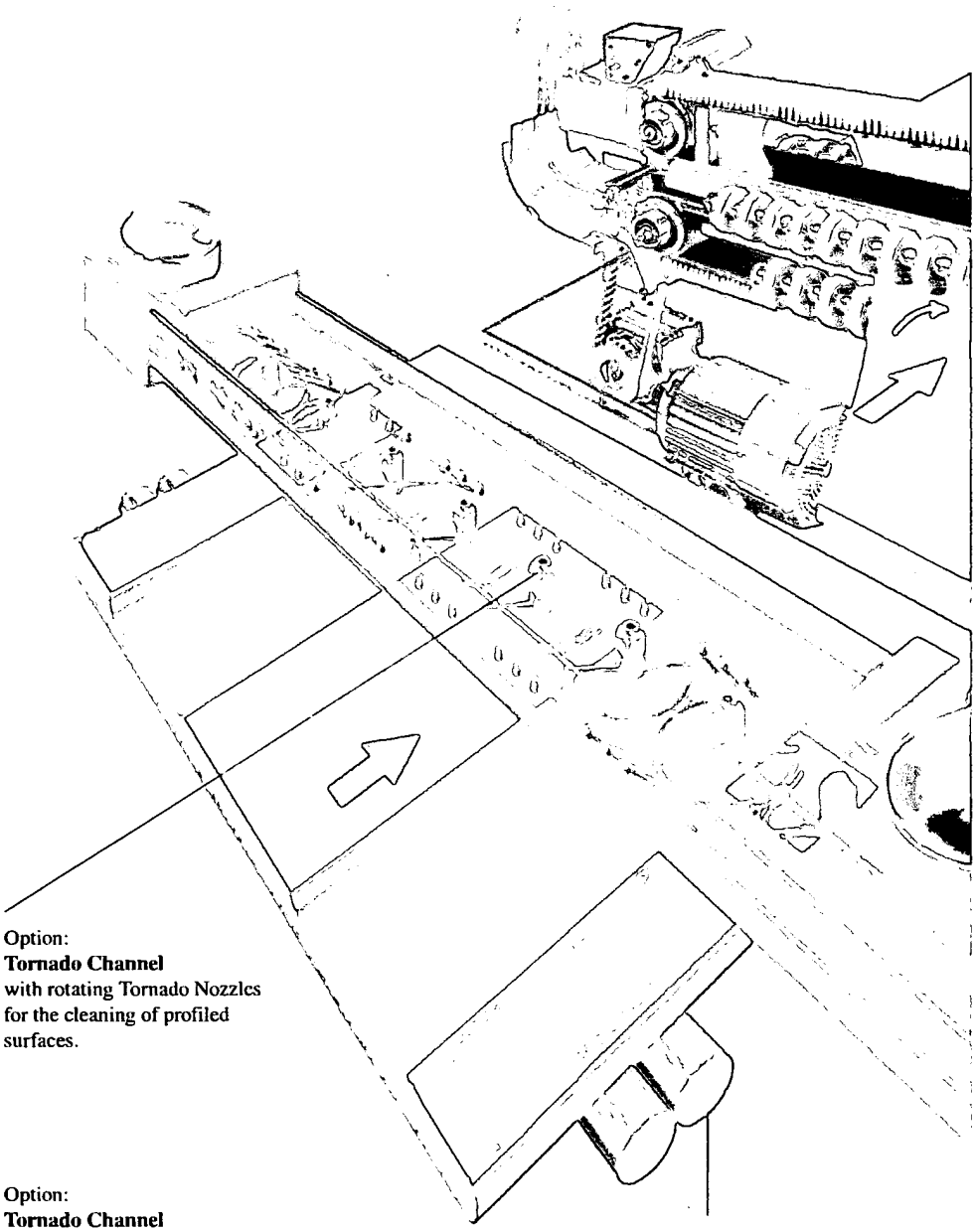
A high speed air channel transports swarf, large particles and dust to the edge of the material.

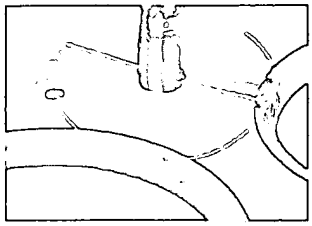
The Ingromat™ process (pat.pend.)

The patented Wandres-Ingromat™ micro-moistening process permits effective removal of even the finest particles. A sprayer delivers a thin film of Ingromat fluid (anti-static cleaning agent) to the tips of the linear brushes. Micro-particles adhere to the brushes, whereby the material surface remains completely dry. Static charges are eliminated preventing recontamination from ambient air.

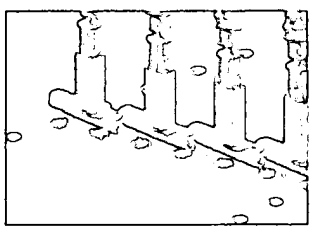


Mirco-moistened **linear brushes** in different wiping directions



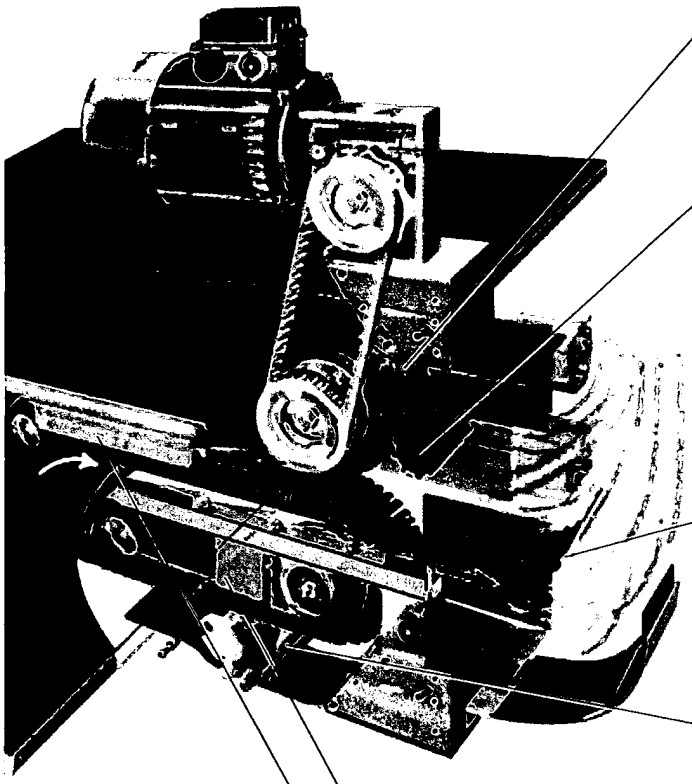


Option:
Tornado Channel
with rotating Tornado Nozzles for the cleaning of profiled surfaces.

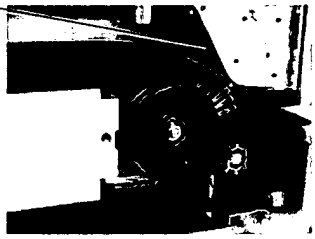


Option:
Tornado Channel
with fixed Power Nozzles for the cleaning of holes and slots. The nozzles can be controlled individually.

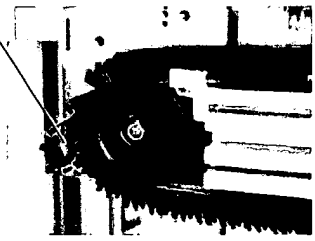
Inverter speed control
matches conveyor to process speed.



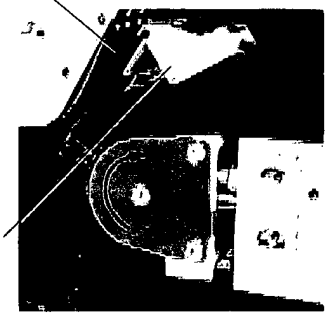
Compressed air nozzles continuously clean the linear brushes.



Rack rotating element (hardened and stainless steel) provides additional cleaning for linear brushes.



Vibrating membranes (red) prevent accumulation of dust and "tacky"fine particles.

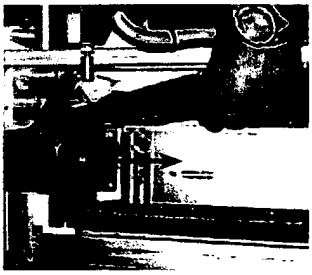


The Ingromat sprayer delivers controllable microscopic amounts of Ingromat to the linear brushes. The colourless Ingromat is shown green for clarity.

Tension roller

High-Speed-Channel: Fixed directional air nozzles provide a powerful pre-clean (shown in blue for clarity)

New: Automatic tension release when replacing brushes



Brush life lies between 3000 and 5000 operating hours. Brush replacement is simple and quick. Tools are not required.

The brushes are threaded automatically (pat.pend.)

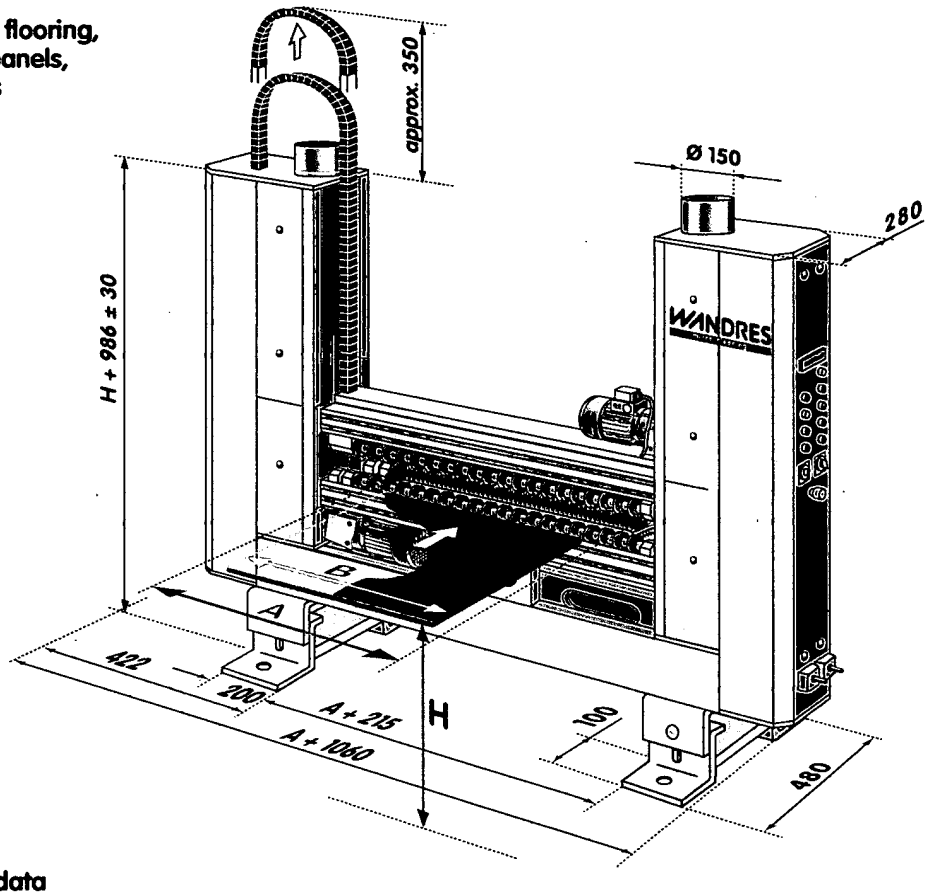
Ingromat-Cleaner
CF 05/A
Electrical/manual height adjustment

CM 05/A
Manual height adjustment

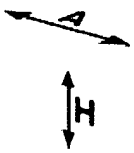
for
laminated flooring,
furniture panels,
flat panels

BIT 140/3/A/2 Cleaning module
2 linear tresy brushes
(with 5 filament rows each),
wiping edge to edge, upper and lower tresy brush wipe in opposite directions

HSC 05/2/A High-Speed-Channel



Technical data



A Nominal width 400 – 3200 mm
A = centre distance of outer brush drive pulleys
Effective cleaning width is 80 mm less than nominal width. $B_{max} = A-80$

H Working height 720, 750, 800, 850, ...1200 mm
adjustable ± 30 mm

C Material length min. 200 mm

D Material thickness max. 100 mm
(option > 100 mm),
depending on subject material

Electrical supply

50 Hz	230/400 V
60 Hz	277/480 V
3.5 kW	

Suction
2 x Ø 150, 2 x 20 – 30 m³/min
Vacuum min. 500 Pa (50 mm W.G.)
Flow velocity > 25 m/s

Pneumatic
3/4" gas, 6 bar, filtered (< 40 µm), dry,
oil free (residual oil < 1.5 mg/m³$_N$ at 24° C)

Ingromat usage (approximate figures)
Laminate: approx. 1.2 l/h
Furniture: approx. 0.8 l/h

Compressed air usage at 6 bar (during cleaning only)

A mm	400	520	650	850	1000	1100
m³/min	1.1	1.2	1.2	1.28	1.28	1.36
A mm	1300	1500	1650	1750	2000	2200
m³/min	1.36	1.44	1.51	1.59	1.70	1.78
A mm	2500	2750	3000	3200		
m³/min	1.85	1.93	2.0	2.09		

High-Speed-Channel nozzles Ø 0.6 mm, pitched at 120 mm intervals

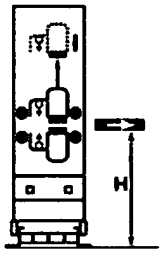
Transport speed adjustable

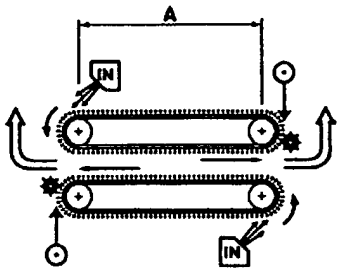
v_1:	2	–	7	m/min
v_2:	5	–	15	m/min
v_3:	10	–	64	m/min
v_4:	20	–	140	m/min
v_5:	50	–	180	m/min
v_6:	80	–	240	m/min

Functional description

Cleaning process

- A High-Speed-Channel provides a powerful pre-clean, blowing direction middle to edge
- The patented Ingromat™ micro-moistening linear brushing process optimises cleaning whilst eliminating static charges **(the subject material remains dry!)**
- Integrated linear tresy brushes (2 in upper and 2 in lower cleaning module) for the double sided cleaning of the surface, filament diameter 0.08 – 0.3 mm, filament length 19 mm, wiping edge to edge
- Optimised mechanical and compressed air assisted self-cleaning of linear tresy brushes



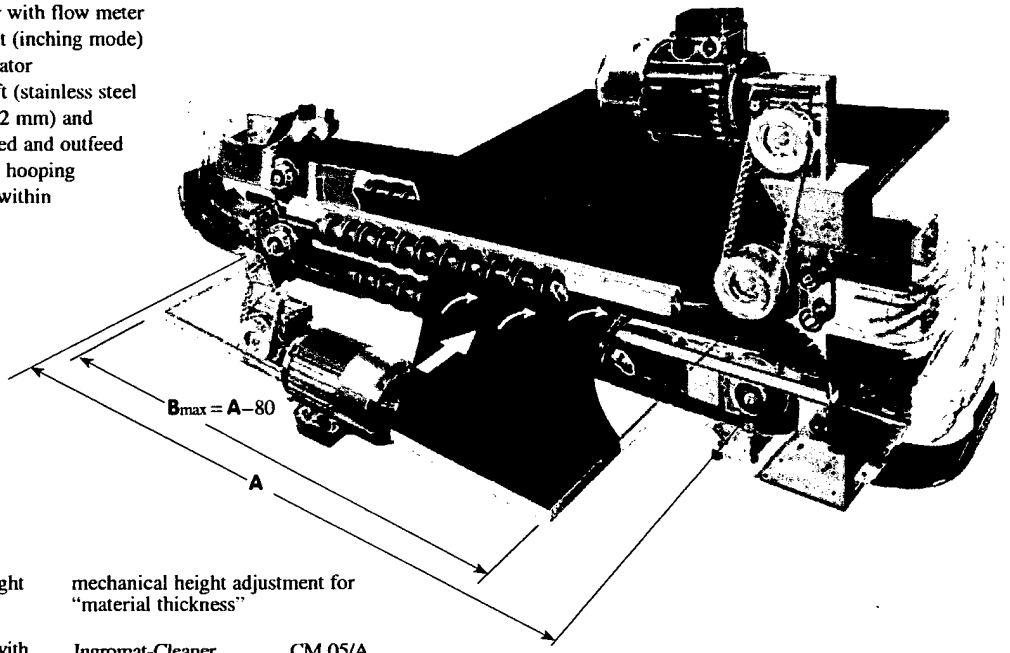


Dimensions

- Minimum material length: C_{min}= 200 mm
- Material thickness: maximum 100 mm
- A space of 300 mm in transport direction is needed to integrate Cleaner

Technical features

- Ingromat™ usage indicator with flow meter
- Electrical height adjustment (inching mode) with digital thickness indicator
  Driven transport roller shaft (stainless steel with polyamide rollers Ø 52 mm) and pressure roller shaft at infeed and outfeed (speed adjustable) standard hooping
- Control cabinet integrated within machine frame
- Machine frame: anodized aluminium, steel



Typical applications

Flat surfaces,
thickness > 3 mm

Product range

electrical + mechanical height adjustment

Ingromat-Cleaner CF 05/A with cleaning module BIT 140/3/**A**/2

Order code	A
1710 -003	400 mm
-004	520 mm
-005	650 mm
-006	850 mm
-007	1000 mm
-008	1100 mm
-009	1300 mm
-010	1500 mm
-011	1650 mm
-012	1750 mm
-013	2000 mm
-014	2200 mm
-015	2500 mm
-016	2750 mm
-017	3000 mm
-018	3200 mm

mechanical height adjustment for "material thickness"

Ingromat-Cleaner CM 05/A with cleaning module BIT 140/3/**A**/1

Order code	A
1711 -003	400 mm
-006	850 mm
-007	1000 mm
-010	1500 mm
-011	1650 mm

Ordering example

Order code	Description	
	Nominal width	A: 1500 mm
1710- 010	**Ingromat-Cleaner**	**CF 05/1500**
	Cleaning module	**BIT 140/3/1500/2**
	High-Speed-Channel	**HSC 05/2/1500**
	Ingromat: 30 l container (Antistatic cleaning agent)	
1711- 010	**Ingromat-Cleaner**	**CM 05/1500**
	Cleaning module	**BIT 140/3/1500/1**
	High-Speed-Channel	**HSC 05/2/1500**
	Ingromat: 30 l container (Antistatic cleaning agent)	

The following features are not present in Cleaner CM 05...:

- Pressure monitor for compressed air
- Electrical height adjustment of cleaning modules

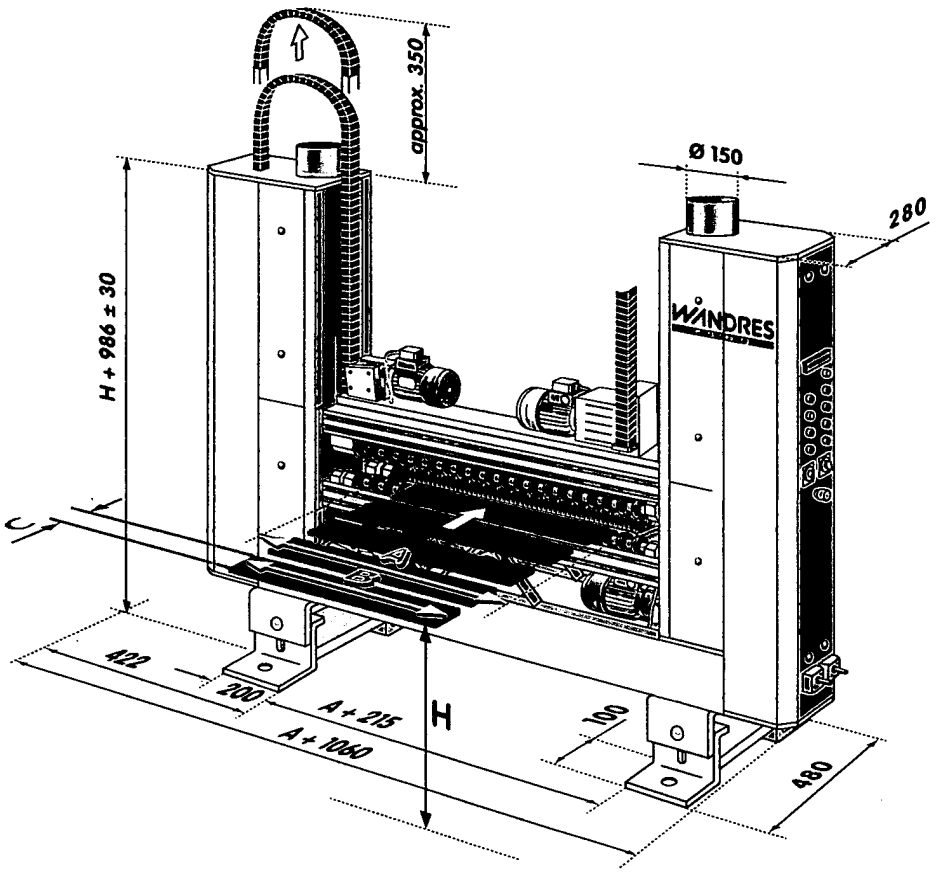
Please see page 30 and following pages for comprehensive ordering guide.

Sword Brush Cleaner CF05/A

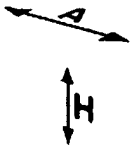
Electrical/manual height adjustment

for
narrow laminates,
furniture parts,
panels

Sword Brush BIQ 246/3/A
2 linear quadro brushes (with 7 filament rows each), wiping edge to edge, upper and lower quadro brush wipe in opposite directions



Technical data



A Nominal width 1000 – 3200 mm
A = centre distance of outer brush drive pulleys
Effective cleaning width is 80 mm less than nominal width. $B_{max} = A-80$, $B_{min} = 800$ if $C < 200$

H Working height 720, 750, 800, ...1200 mm adjustable ± 30 mm

C Material length (if C < 200, min. panel width must be 800 mm)

D Material thickness max. 15 mm

Electrical supply

50 Hz	230/400 V
60 Hz	277/480 V
5.0 kW	

Suction
2 x Ø 150, 2 x 20 – 30 m³/min
Vacuum min. 500 Pa (50 mm W.G.)
Flow velocity > 25 m/s

Pneumatic
3/4" gas, 6 bar, filtered (< 40 µm), dry, oil free (residual oil < 1.5 mg/m³$_N$ at 24° C)

Ingromat usage (approximate figures)
Laminate: approx. 1.2 l/h
Furniture: approx. 0.8 l/h

Compressed air usage at 6 bar (during cleaning only)

A mm	1000	1100	1300	1500
m³/min	1.91	2.11	2.19	2.39
A mm	1650	1750	2000	2200
m³/min	2.45	2.55	2.75	2.90
A mm	2500	2750	3000	
m³/min	3.25	3.35	3.60	

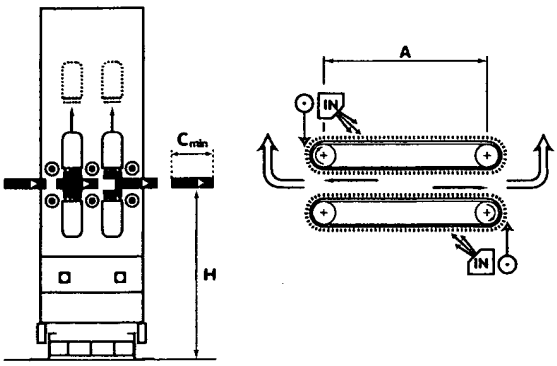
Transport speed adjustable

v_1:	2	–	7	m/min
v_2:	5	–	15	m/min
v_3:	10	–	64	m/min
v_4:	20	–	140	m/min
v_5:	50	–	180	m/min
v_6:	80	–	240	m/min

Functional description

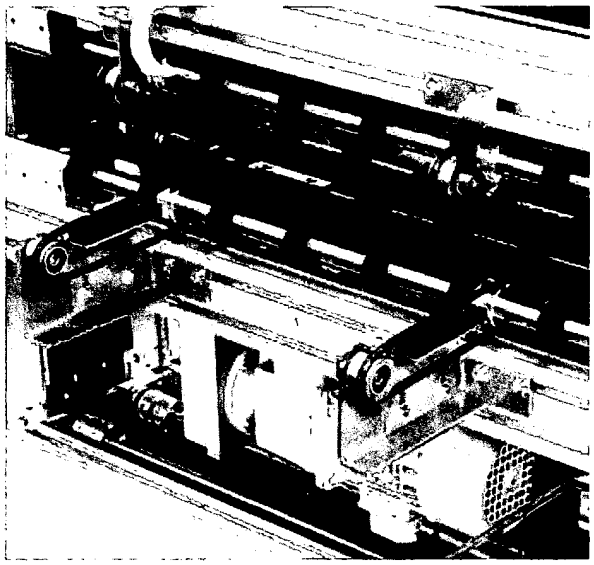
Cleaning process

- Micro-moistening of linear quadro brushes (patented Ingromat™ process) optimises cleaning whilst eliminating static charges **(the subject material remains dry!)**
- Integrated Sword Brushes for the double sided cleaning of the surface, filament diameter 0.08 – 0.3 mm, filament length 19 mm, wiping edge to edge
- Optimised mechanical and compressed air assisted self-cleaning of linear quadro brushes



Dimensions

- Minimum material length Cmin = 100 mm
- Material thickness: maximum 15 mm
- A space of 300 mm in transport direction is needed to integrate Cleaner



Technical features

- Ingromat™ usage indicator with flow meter
- Electrical height adjustment (inching mode) with digital thickness indicator
- Driven transport roller shaft (stainless steel with polyamide rollers Ø 52 mm) and pressure roller shaft at infeed and outfeed (speed adjustable) standard hooping
- Control cabinet integrated within machine frame (inverter control for transport roller drive made by Telemechanique)
- Separate control cabinet (surplus price) necessary if inverter control from Siemens for transport roller drive is requested
- Machine frame: anodized aluminium, steel
- Driven transport rollers between linear brushes

Typical applications

Flat surfaces, laminate flooring
thickness > 3 mm, min. length 100 mm

Product range

Ingromat-Cleaner CF05 with
Cleaning module BIQ 247/3/**A**

Order code	**A**
1714 -010	1500 mm
-011	1650 mm
-012	1750 mm
-013	2000 mm
-014	2200 mm
-015	2500 mm
-016	2750 mm
-017	3000 mm

Ordering example

Order code	**Description**	
	Nominal width	A: 1500 mm
1714- 010	**Ingromat-Cleaner**	**CF 05/1500**
	Cleaning module	**BIQ 247/3/1500**
	Ingromat: 30 l container (Antistatic cleaning agent)	

Please see page 30 and following pages for comprehensive ordering guide.

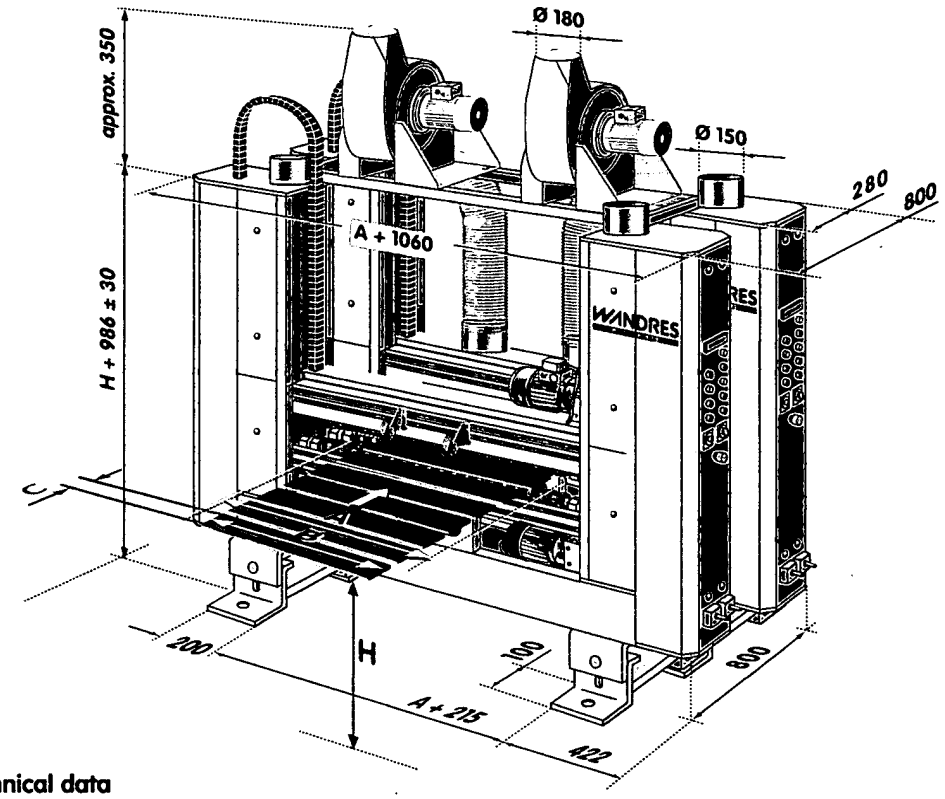
for narrow panels

Ingromat-Cleaner CVT 05 and CVB 05

for narrow laminated flooring, furniture parts, panels

BIT 140/1/A/1 Cleaning module
2 linear tresy brushes (with 5 filament rows each), wiping edge to edge

HSC 04/2/A High-Speed-Channel



Technical data

A Nominal width 1000 – 1650 mm
A = centre distance of outer brush drive pulleys
Effective cleaning width is 80 mm less than nominal width. $B_{max} = A - 80$

H Working height 720, 750, 800, 850, ...1200 mm
adjustable ± 30 mm

C Material length min. 65 mm

D Material thickness max. 10 mm

Electrical supply

50 Hz	230/400 V
60 Hz	277/480 V

4.1 kW

Suction
4 x Ø 150, 2 x 20-30 m³/min
2 x Ø 180
Vacuum min. 500 Pa (50 mm W.G.)
Flow velocity > 25 m/s

Pneumatic
3/4" gas, 6 bar, filtered (< 40 µm), dry,
oil free (residual oil < 1.5 mg/m³$_N$ at 24° C)

Ingromat usage (approximate figures)
approx. 0.4 - 0.6 l/h pro Cleaner

Compressed air usage pro Cleaner
at 6 bar (during cleaning only)

A mm	1000	1500	1650
m³/min	0.7	0.75	0.8

High-Speed-Channel nozzles Ø 0.6 mm, pitched at 120 mm intervals

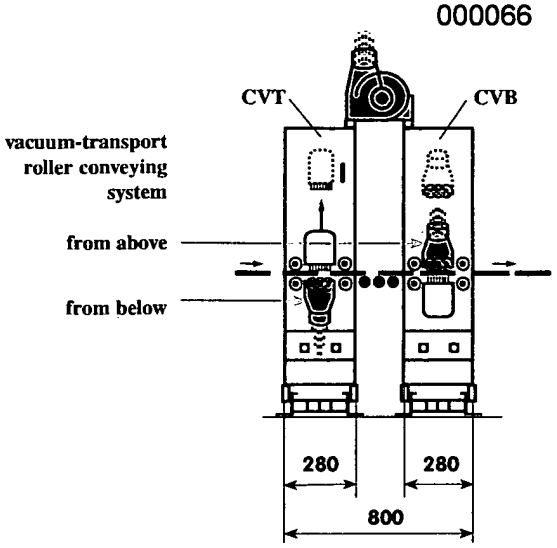
Transport speed adjustable

v_1:	2	– 7	m/min
v_2:	5	– 15	m/min
v_3:	10	– 64	m/min

Functional description

Cleaning process

- A High-Speed-Channel provides a powerful pre-clean, blowing direction middle to edge
- The patented Ingromat™ micro-moistening linear brushing process optimises cleaning whilst eliminating static charges **(the subject material remains dry!)**
- Integrated linear tresy brushes for the single sided cleaning of the surface, filament diameter 0.08 – 0.3 mm, filament length 19 mm, wiping edge to edge
- Optimised mechanical and compressed air assisted self-cleaning of linear tresy brushes

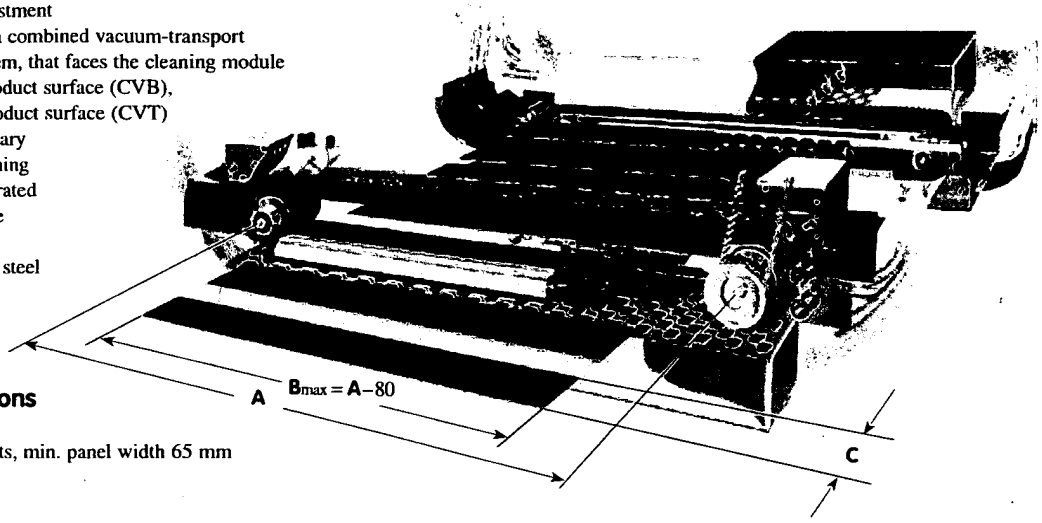


Dimensions

- Minimum material length: $C_{min.}$ = 65 mm
- Material thickness: maximum 10 mm

Technical features

- Ingromat™ usage indicator with flow meter
- Electrical height adjustment
- Material transport via combined vacuum-transport roller conveying system, that faces the cleaning module
- Cleaning of lower product surface (CVB), Cleaning of upper product surface (CVT)
- 2 Cleaners are necessary for double sided cleaning
- Control cabinet integrated within machine frame
- Machine frame: anodized aluminium, steel



Typical applications

Flat surfaces,
extremely narrow parts, min. panel width 65 mm
thickness > 3 mm

Product range

Cleaning of upper product surface

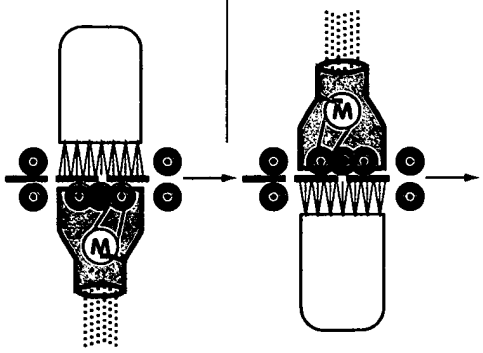
Ingromat-Cleaner CVT 05/A with cleaning module BIT 140/1/A

Order code	A ⌋
1631-007	1000 mm
-010	1500 mm
-011	1650 mm

Cleaning of lower product surface

Ingromat-Cleaner CVB 05/A with cleaning module BIT 140/1/A

Order code	A ⌋
1621-007	1000 mm
-010	1500 mm
-011	1650 mm



Ordering example

Order code	Description	
	Nominal width	A: 1500 mm
1621-010	**Ingromat-Cleaner**	**CVB 05/1500**
	Cleaning module	**BIT 140/1/1500**
	High-Speed-Channel	**HSC 04/2/1500**

Ingromat: 30 l container
(Antistatic cleaning agent)

Please see page 30 and following pages for comprehensive ordering guide.

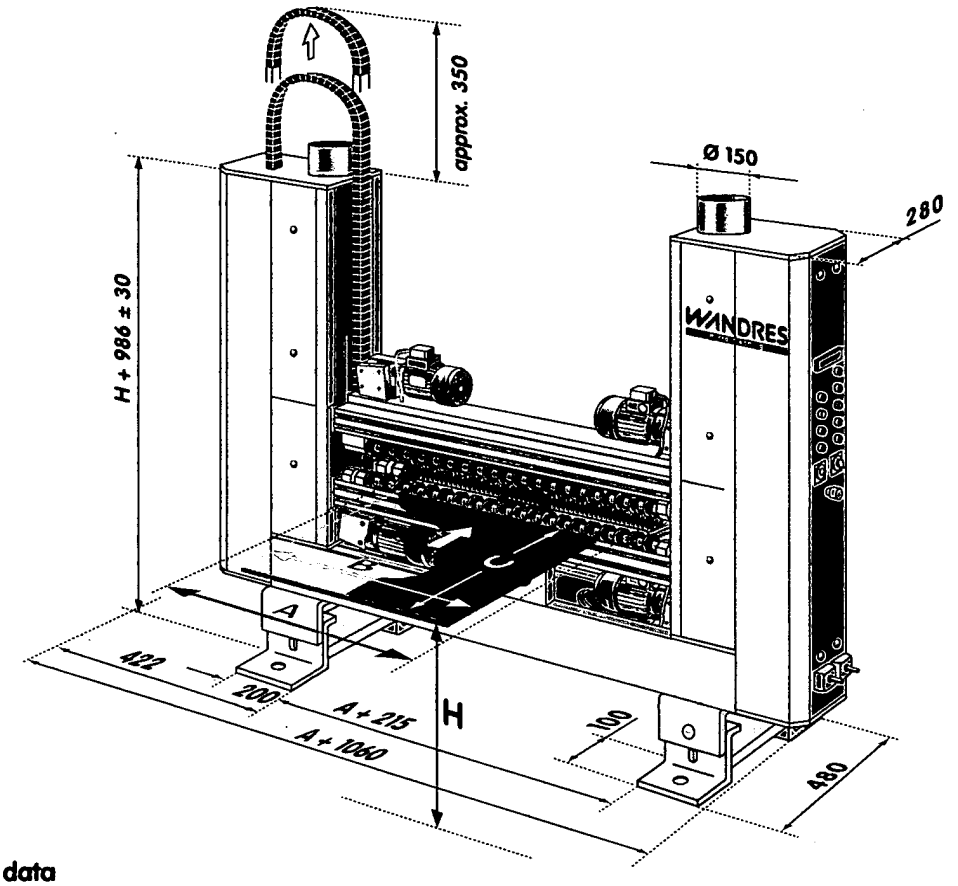
Ingromat-Cleaner CF 05/A

for

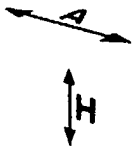
Sheets	**Plastic materials**
Printed Circuits	**Metal**
Blanks	**Glass**
Foils	

BIT 140/4/A/2 Cleaning module
2 linear tresy brushes (with 5 filament rows each), wiping middle to edge
in upper and lower cleaning module

HSC 05/2/A High-Speed-Channel



Technical data



A Nominal width 650 – 5000 mm
A = centre distance of outer brush drive pulleys
Effective cleaning width is 80 mmless than nominal width. $B_{max} = A-80$

H Working height 720, 750, 800, ...1200 mm adjustable ± 30 mm

C Material length min. 200 mm

D Material thickness max. 100 mm (>100 optional)

Electrical supply

50 Hz	230/400 V
60 Hz	277/480 V
5.0 kW	

Suction
2 x Ø 150, 2 x 20 – 30 m³/min
Vacuum min. 500 Pa (50 mm W.G.)
Flow velocity > 25 m/s

Pneumatic
3/4" gas, 6 bar, filtered (< 40 µm), dry,
oil free (residual oil < 1.5 mg/m^3_N at 24° C)

Ingromat usage (approximate figures)
0.8 l/h – 1.2 l/h

Compressed air usage at 6 bar (during cleaning only)

A mm	650	850	1000	1100	1300	1500
m³ /min	1.41	1.49	1.49	1.57	1.57	1.67
A mm	1650	1750	2000	2200	2500	2750
m³ /min	1.75	1.83	1.91	1.99	2.07	2.15
A mm	3000	3200	3500	3750	4000	4300
m³ /min	2.25	2.33	2.41	2.49	2.56	2.64
A mm	4500	4750	5000			
m³ /min	2.75	2.83	2.90			

High-Speed-Channel nozzles Ø 0.6 mm, pitched at 120 mm intervals

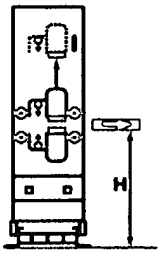
Transport speed adjustable

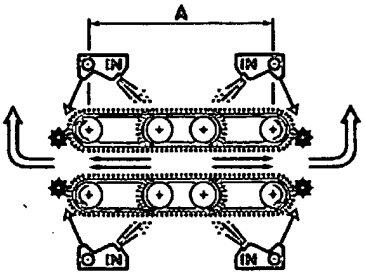
v_1:	2	–	7	m/min
v_2:	5	–	15	m/min
v_3:	10	–	64	m/min
v_4:	20	–	140	m/min
v_5:	50	–	180	m/min
v_6:	80	–	240	m/min

Functional description

Cleaning process

- A High-Speed-Channel provides a powerful pre-clean, blowing direction middle to edge
- The patented Ingromat™ micro-moistening linear brushing process optimises cleaning whilst eliminating static charges **(the subject material remains dry!)**
- Integrated linear tresy brushes (2 in upper and 2 in lower cleaning module) for the double sided cleaning of the surface, filament diameter 0.08 – 0.3 mm, filament length 19 mm, wiping middle to edge
- Optimised mechanical and compressed air assisted self-cleaning of linear tresy brushes



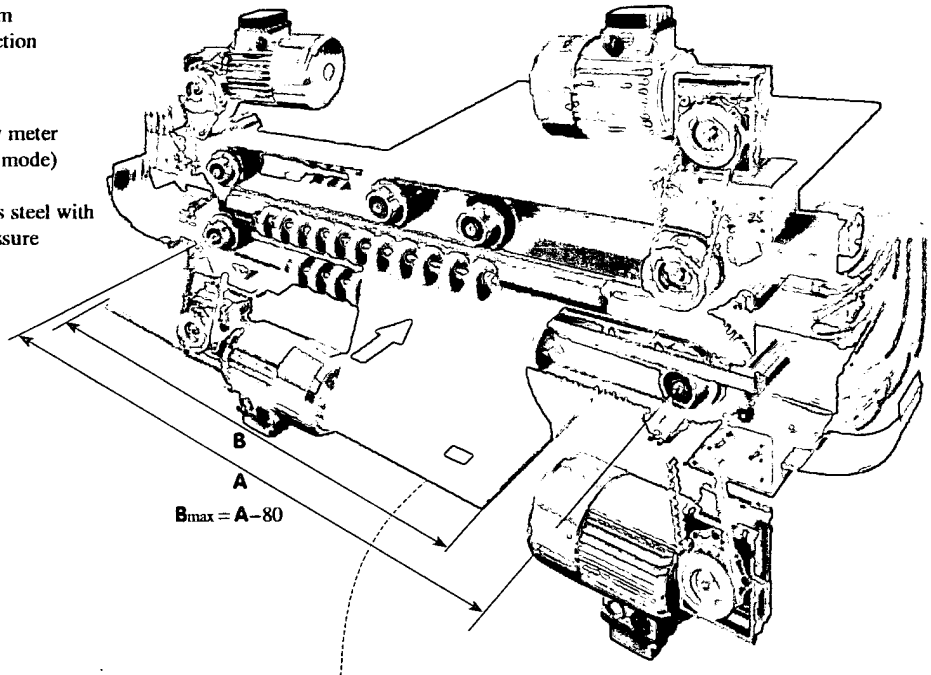


Dimensions

- Minimum material length: $C_{min.}$ = 200 mm
- Material thickness: maximum 100 mm
- A space of 300 mm in transport direction is needed to integrate Cleaner

Technical features

- Ingromat™ usage indicator with flow meter
- Electrical height adjustment (inching mode) with digital thickness indicator
- Driven transport roller shaft (stainless steel with polyamide rollers Ø 52 mm) and pressure roller shaft at infeed and outfeed (speed adjustable) standard hooping
- Control cabinet integrated within machine frame
- Machine frame: anodized aluminium, steel



Typical applications

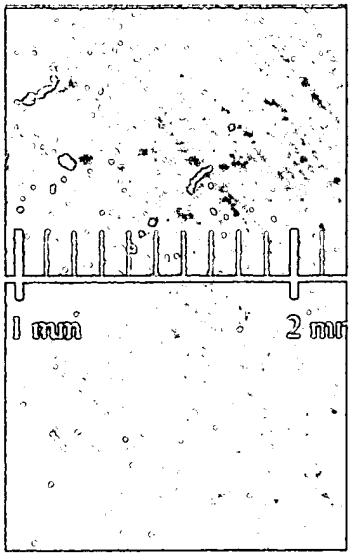
Flat surfaces, foils, sheets, large panels and flat glass

Product range

Ingromat-Cleaner CF 05/A with cleaning module BIT 140/4/**A**

Order code	A
1721-005	650 mm
-006	850 mm
-007	1000 mm
-008	1100 mm
-009	1300 mm
-010	1500 mm
-011	1650 mm
-012	1750 mm
-013	2000 mm
-014	2200 mm
-015	2500 mm
-016	2750 mm
-017	3000 mm
-018	3200 mm
-019	3500 mm
-020	3750 mm
-021	4000 mm
-022	4300 mm
-023	4500 mm
-024	4750 mm
-025	5000 mm

Magnified panel surface before and after cleaning



Ordering example

Order code	Description	
	Nominal width	A: 1500 mm
1721-010	**Ingromat-Cleaner**	**CF 05/1500**
	Cleaning module	**BIT 140/4/1500/2**
	High-Speed-Channel	**HSC 05/2/1500**

Ingromat: 30 l container
(Antistatic cleaning agent)

Please see page 30 and following pages for comprehensive ordering guide.

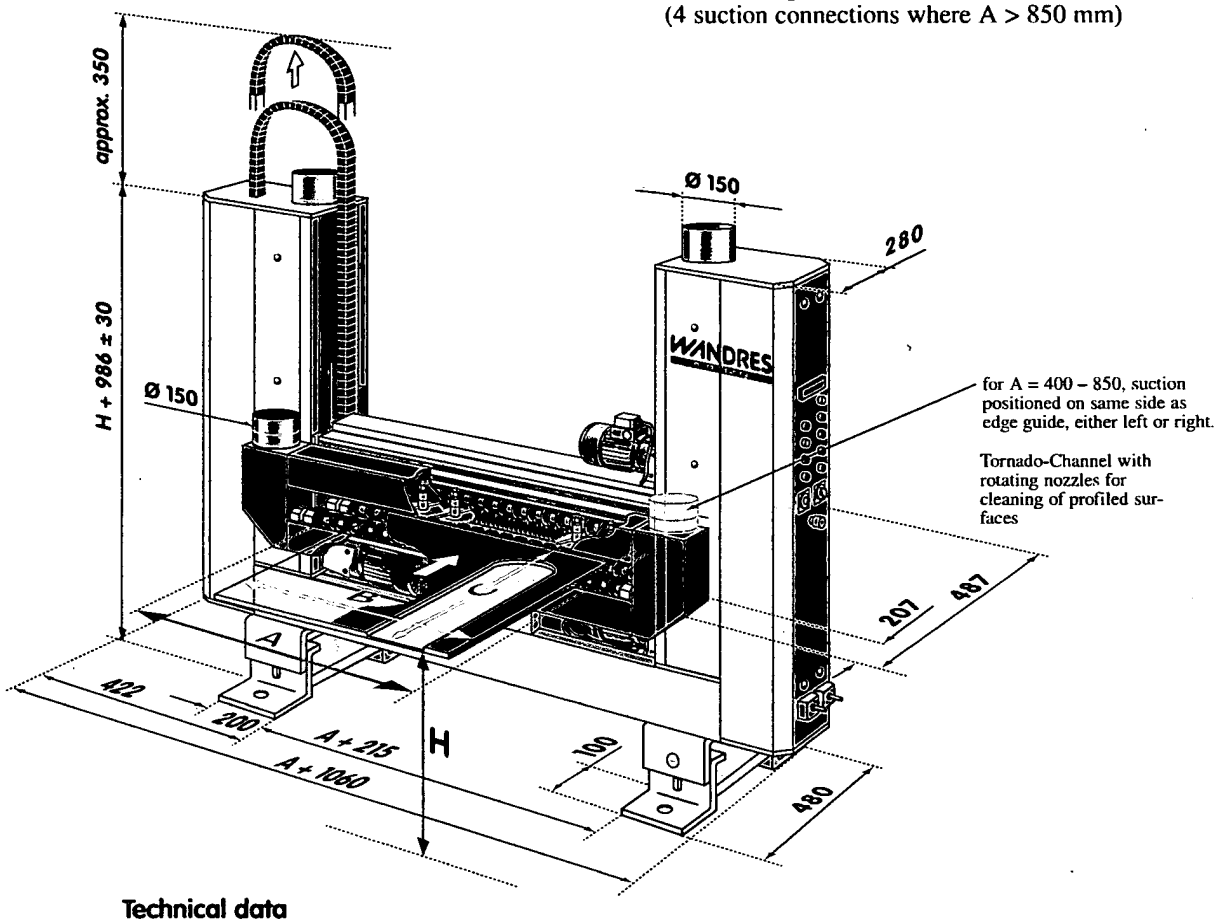
Option Motor covering for Clean Room applications.

Ingromat-Cleaner CF 05/A

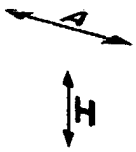
for
the cleaning of profiled surfaces

BIT 140/3/A/0 Cleaning module
2 linear tresy brushes (with 5 filament rows each), wiping edge to edge, upper and lower tresy brush wipe in opposite directions

TKR 04/2/A Tornado-Channel
with rotating nozzles
(4 suction connections where A > 850 mm)



Technical data



A Nominal width 400 – 3000 mm
A = centre distance of outer brush drive pulleys
Effective cleaning width is 80 mm less than nominal width. $B_{max} = A - 80$

H Working height 720, 750, 800, 850, ...1200 mm
adjustable ± 30 mm

C Material length min. 200 mm

D Material thickness max. 100 mm (>100 optional)

Electrical supply

50 Hz	230/400 V
60 Hz	277/480 V
3.5 kW	

Suction

A: 400 – 850 mm	3 x Ø 150, 3 x 20 – 30 m³/min
A: 1000 – 3000 mm	4 x Ø 150, 4 x 20 – 30 m³/min

Vacuum min. 500 Pa (50 mm W.G.)
Flow velocity > 25 m/s

Pneumatic
1" gas, 6 bar, filtered (< 40 µm), dry,
oil free (residual oil < 1.5 mg/m^3_N at 24° C)

Ingromat usage (approximate figures)
0.8 l/h – 1.2 l/h

Compressed air usage at 6 bar (during cleaning only)

A mm	400	520	650	850	1000	1100
m³/min	1.45	1.52	1.64	1.80	1.91	2.11
A mm	1300	1500	1650	1750	2000	2200
m³/min	2.19	2.39	2.45	2.55	2.75	2.90
A mm	2500	2750	3000			
m³/min	3.25	3.35	3.60			

Each activated rotating nozzle will add 0.123 m³/min.
Rotating Tornado Nozzles are pitched at 140 mm intervals in the Tornado-Channel. All nozzles may be activated simultaneously

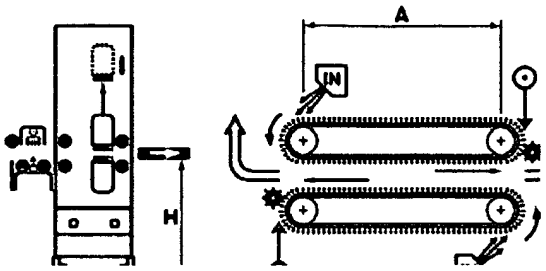
Transport speed adjustable

v_1:	2	– 7	m/min
v_2:	5	– 15	m/min
v_3:	10	– 64	m/min
v_4:	20	– 140	m/min
v_5:	80	– 240	m/min

Functional description

Cleaning process

- Fixed Tornado-Channel nozzles produce a cross flow and the rotating Tornado Nozzles effectively clean profiled surfaces
- The patented Ingromat™ micro-moistening linear brushing process optimises cleaning whilst eliminating static charges **(the subject material remains dry!)**
- Integrated linear tresy brushes (2 in upper and 2 in lower cleaning module) for the double sided cleaning of the surface, filament diameter 0.08 – 0.3 mm, filament length 19 mm, wiping edge to edge
- Optimised mechanical and compressed air assisted self-cleaning of linear tresy brushes

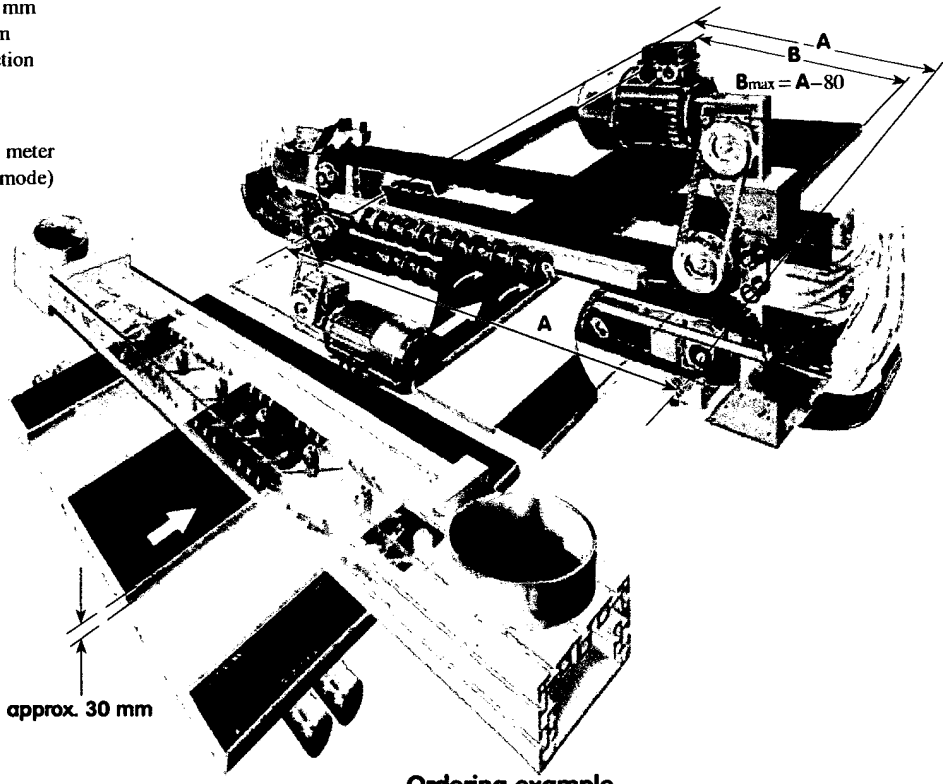


Dimensions

- Minimum material length: $C_{min.}$ = 200 mm
- Material thickness: maximum 100 mm
- A space of 500 mm in transport direction is needed to integrate Cleaner

Technical features

- Ingromat™ usage indicator with flow meter
- Electrical height adjustment (inching mode) with digital thickness indicator
- Driven transport roller shaft (stainless steel with polyamide rollers Ø 52 mm) and pressure roller shaft at infeed and outfeed (speed adjustable) standard hooping
- Control cabinet integrated within machine frame
- Machine frame: anodized aluminium, steel



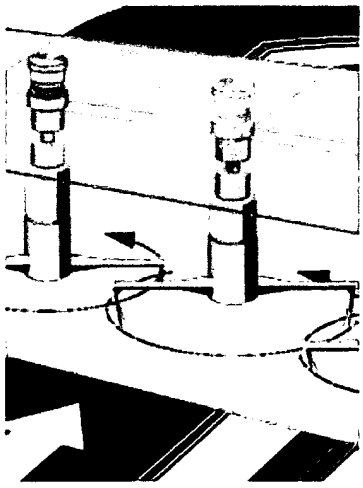
Typical applications

Furniture manufacturers,
after routing,
cleaning of profiled surfaces

Product range

Ingromat-Cleaner CF 05/A with
Cleaning module BIT 140/3/**A**

Order code	**A**
1731 -003	400 mm
-004	520 mm
-005	650 mm
-006	850 mm
-007	1000 mm
-008	1100 mm
-009	1300 mm
-010	1500 mm
-011	1650 mm
-012	1750 mm
-013	2000 mm
-014	2200 mm
-015	2500 mm
-016	2750 mm
-017	3000 mm



Ordering example

Order code	**Description**	
	Nominal width	A: 1500 mm
1731- 010	**Ingromat-Cleaner**	**CF 05/1500**
	Cleaning module	**BIT 140/3/1500/0**
	Tornado-Channel	**TKR 04/2/1500**

Ingromat: 30 l container
(Antistatic cleaning agent)

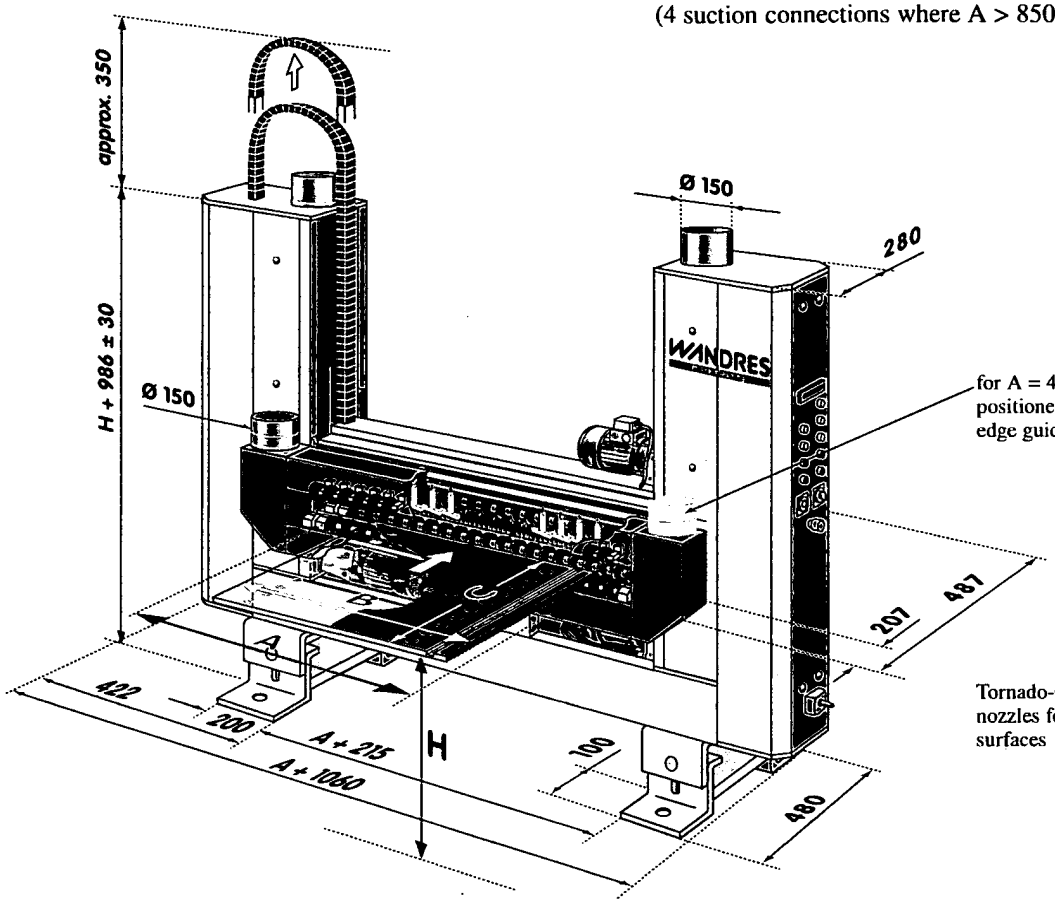
Please see page 30 and following pages for comprehensive ordering guide.

Ingromat-Cleaner CF 05/A

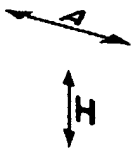
for
the cleaning of profiled surfaces, holes and slots

BIT 140/3/A/0 Cleaning module
2 linear tresy brushes (with 5 filament rows each), wiping edge to edge, upper and lower tresy brush wipe in opposite directions

TKF 04/2/A Tornado-Channel
with Power nozzles
(4 suction connections where A > 850 mm)



Technical data



A Nominal width 400 – 3000 mm
A = centre distance of outer brush drive pulleys
Effective cleaning width is 80 mm less than nominal width. $B_{max} = A - 80$

H Working height 720, 750, 800, 850, ...1200 mm adjustable ± 30 mm

C Material length min. 200 mm

D Material thickness max. 100 mm (>100 optional)

Electrical supply

50 Hz	230/400 V
60 Hz	277/480 V
3.5 kW	

Suction

A: 400 – 850 mm	3 x Ø 150, 3 x 30 m³/min
A: 1000 – 3000 mm	4 x Ø 150, 4 x 30 m³/min

Vacuum min. 500 Pa (50 mm W.G.)
Flow velocity > 30 m/s

Pneumatic
1" gas, 6 bar, filtered (< 40 µm), dry,
oil free (residual oil < 1.5 mg/m^3_N at 24° C)

Ingromat usage (approximate figures)
0.8 l/h – 1.2 l/h

Compressed air usage at 6 bar (during cleaning only)

A mm	400	520	650	850	1000	1100
m³/min	1.42	1.56	1.68	1.91	2.07	2.19
A mm	1300	1500	1650	1750	2000	2200
m³/min	2.35	2.58	2.70	2.80	3.08	3.30
A mm	2500	2750	3000			
m³/min	3.60	3.85	4.15			

Each activated Power nozzle will add 0.433 m³/min
Power nozzles are pitched at 40 mm intervals in the Tornado-Channel. 10 Power nozzles may be activated simultaneously.

Transport speed adjustable

v_1:	2 – 7	m/min	
v_2:	5 – 15	m/min	
v_3:	10 – 64	m/min	if v > 30 m/min, particles in small holes may not be effectively removed. Please contact us.
v_4:	20 – 140	m/min	
v_5:	80 – 240	m/min	

Functional description

Cleaning process

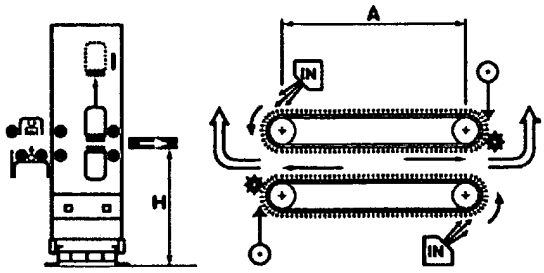
- Fixed Tornado-Channel nozzles produce a cross flow and the Power Nozzles effectively clean profiled surfaces, holes and slots
- The patented Ingromat™ micro-moistening linear brushing process optimises cleaning whilst eliminating static charges
  (the subject material remains dry!)
- Integrated linear tresy brushes
  (2 in upper and 2 in lower cleaning module)
  for the double sided cleaning of the surface,
  filament diameter 0.08 – 0.3 mm,
  filament length 19 mm, wiping edge to edge
- Optimised mechanical and compressed air assisted self-cleaning of linear tresy brushes

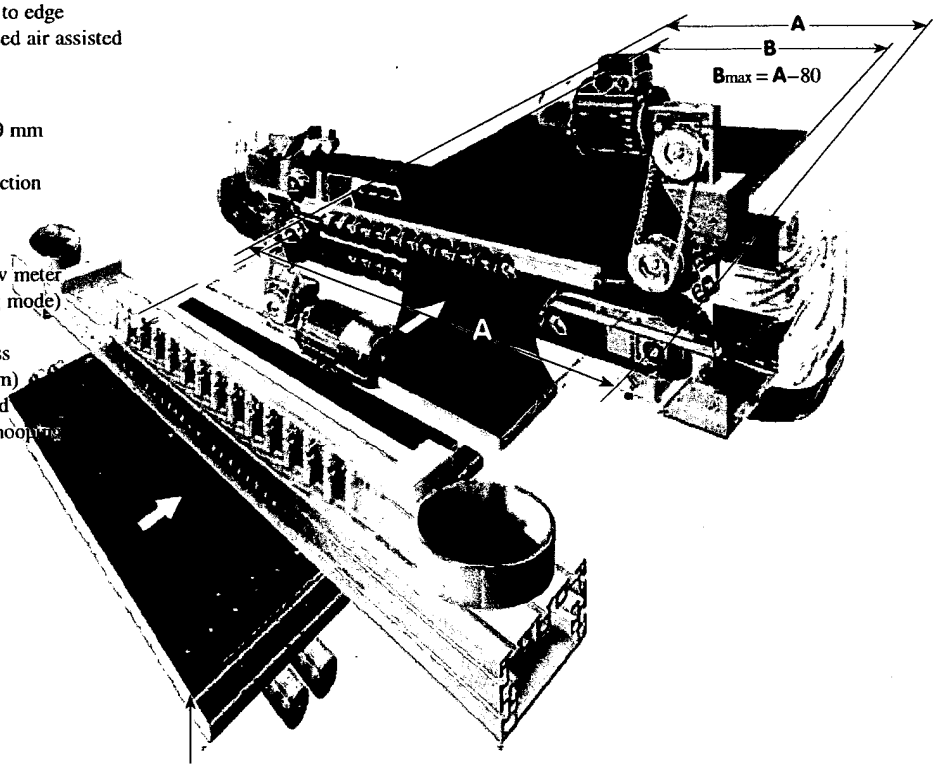
Dimensions

- Minimum material length: $C_{min.}$ = 200 mm
- Material thickness: 3-100 mm
- A space of 500 mm in transport direction is needed to integrate Cleaner

Technical features

- Ingromat™ usage indicator with flow meter
- Electrical height adjustment (inching mode) with digital thickness indicator
- Driven transport roller shaft (stainless steel with polyamide rollers Ø 52 mm) and pressure roller shaft at infeed and outfeed (speed adjustable) standard hooping
- Control cabinet integrated within machine frame
- Machine frame: anodized aluminium, steel





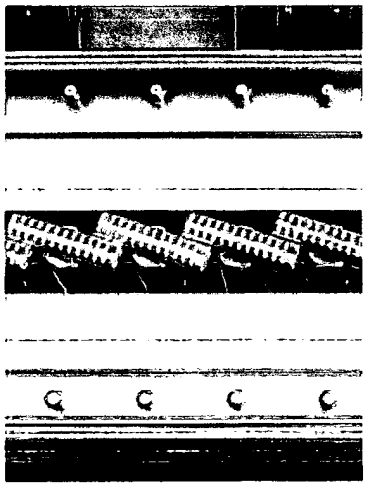
Typical applications

Furniture manufacturers,
after routing, drilling,
cleaning of profiled surfaces

Product range

Ingromat-Cleaner CF 05/A with cleaning module BIT 140/3/**A**

Order code	A
1741 -003	400 mm
-004	520 mm
-005	650 mm
-006	850 mm
-007	1000 mm
-008	1100 mm
-009	1300 mm
-010	1500 mm
-011	1650 mm
-012	1750 mm
-013	2000 mm



min. Ø 4 mm with
max. depth 10 mm

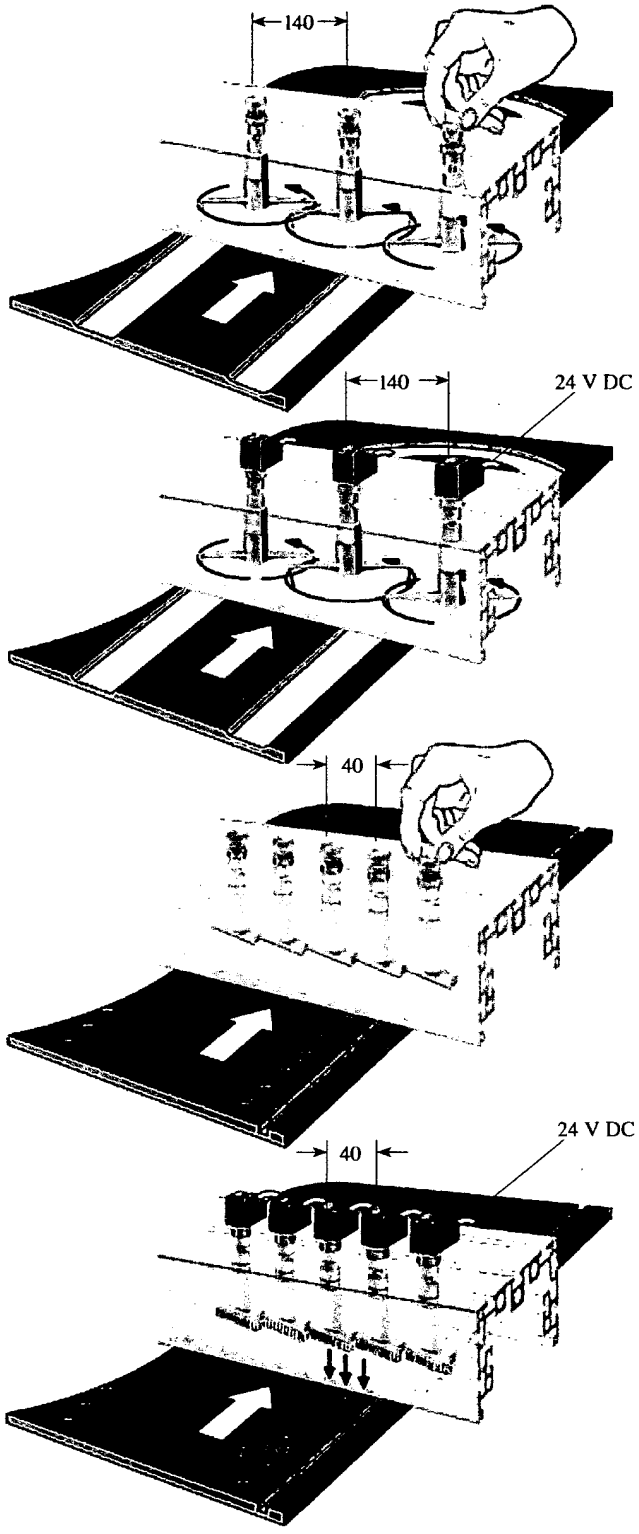
Ordering example

Order code	**Description**	
	Nominal width	A: 1500 mm
1741- 010	**Ingromat-Cleaner**	**CF 05/1500**
	Cleaning module	**BIT 140/3/1500/0**
	Tornado-Channel	**TKF 04/2/1500**

Ingromat: 30 l container
(Antistatic cleaning agent)

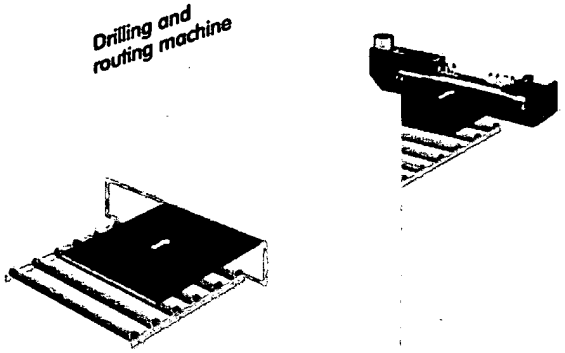
Please see page 30 and following pages for comprehensive ordering guide.

Control of individual Tornado and Power nozzles



Order code	Description
408 - 001	**Tornado-Channel with manually controlled valves** pitched at 140 mm intervals, manual pre-selection of rotating Tornado nozzles. Not applicable if valves are electrically controlled.
408 - 002	**Tornado-Channel with electrically controlled valves** pitched at 140 mm intervals, electrical pre-selection of rotating Tornado Nozzles.
408 - 001	**Tornado-Channel with manually controlled valves** pitched at 40 mm intervals, manual pre-selection of fixed Power nozzles. Not applicable if valves are electrically controlled.
408 - 002	**Tornado-Channel with electrically controlled valves** pitched at 40 mm intervals, electrical pre-selection of fixed Power nozzles.
408 - 003	**Ex valve** zone 2

Supplementary information on Cleaners with Tornado-Channel

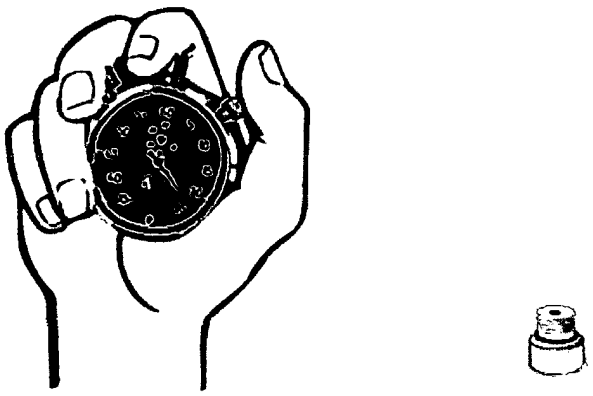


Why clean holes drilled from above?

Holes must be cleaned if assembly or painting follow machining. If fittings are to be mounted automatically, difficulties will result if there are residual particles in blind holes.

Compressed air usage

Usage is minimised by activating only the nozzles situated directly above profiles, holes and slots.

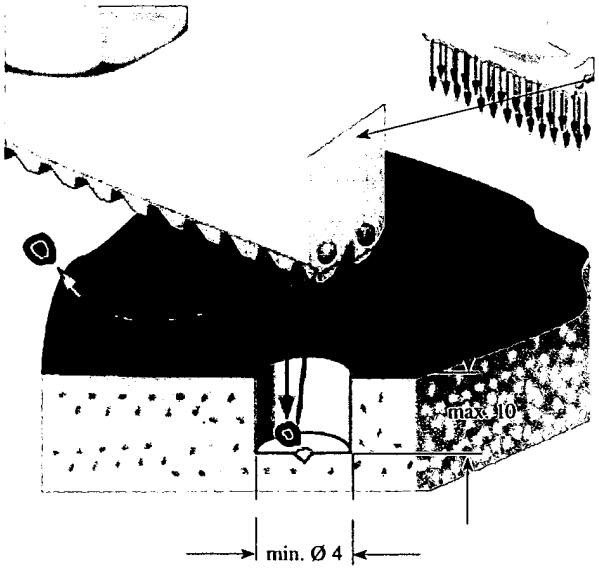


Cleaning time available

The fixed Power nozzles in the Tornado-Channel clean all blind holes of Ø 4 mm and above. At a transport speed of 30 m/min, the effective cleaning time per hole is less than 1/100 s!

Power nozzle design

The head of the nozzle comprises many prismatic shapes. The particles that are hurled out of the blind holes by the air-jet (with sonic speed) are diagonally discharged.



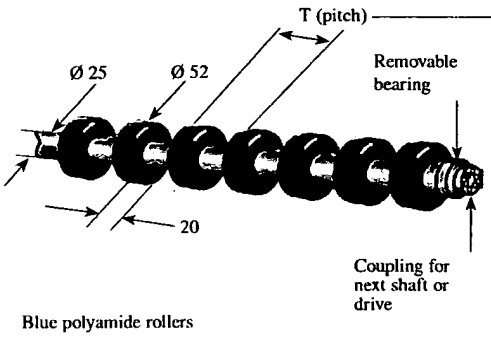
Data exchange

The Cleaner design enables the actuation of individual nozzles at precise moments in time which reduces operation costs. Some terotechnologists already provide software producing electrical signals from the drilling and sanding programmes that will communicate with the Tornado-Channel nozzles segments.

Control of operating costs

Optimise product flow to feed panels narrow-wise allowing unused nozzles to be switched off. Another option may be to integrate a Tornado nozzle into the suction hood of the drilling/routing machine (see separate brochure on Tornado-Channel TKF 180 and TKR 180)

Transport roller shafts Ø 52 for Cleaner CF 05...



Blue polyamide rollers

Standard T = 50 at guide rail
Standard T = 100 from 2nd roller shaft
Special T = 25 special design e.g. for edge cleaning

Order code	T	A (mm) with 1 roller shaft				
		400	520	650	850	1000
700-	50					
701-	100					
702-	25	-003	-004	-005	-006	-007
703-	100					
704-	50					

Order code	T	A (mm) with 2 roller shafts					
		1100	1300	1500	1650	1750	2000
700-	50						
701-	100						
702-	25	-008	-009	-010	-011	-012	-013
703-	100						
704-	50						

Order code	T	A (mm) with 3 roller shafts				
		2200	2500	2750	3000	3200
700-	50					
701-	100					
702-	25	-014	-015	-016	-017	-018
703-	100					
704-	50					

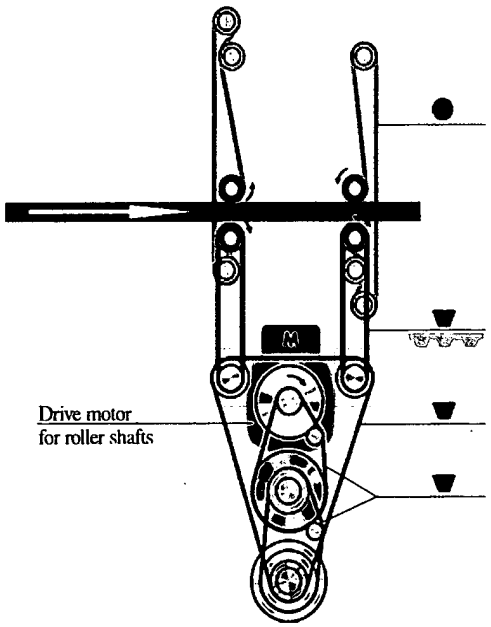
Order code	T	A (mm) with 4 roller shafts			
		3500	3750	4000	4300
700-	50				
701-	100				
702-	25	-019	-020	-021	-022
703-	100				
704-	50				

Order code	T	A (mm) with 5 roller shafts		
		4500	4750	5000
700-	50			
701-	100			
702-	25	-023	-024	-025
703-	100			
704-	50			

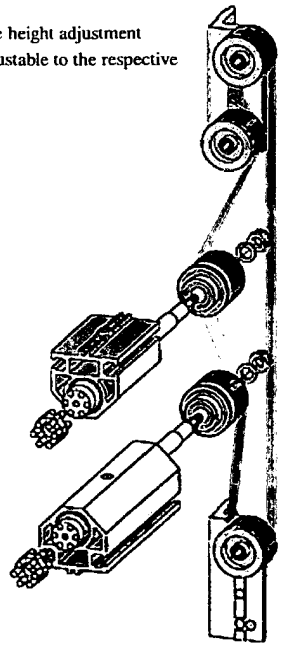
Order example for Cleaner with nominal width A = 1500 mm and pitch T = 50 mm

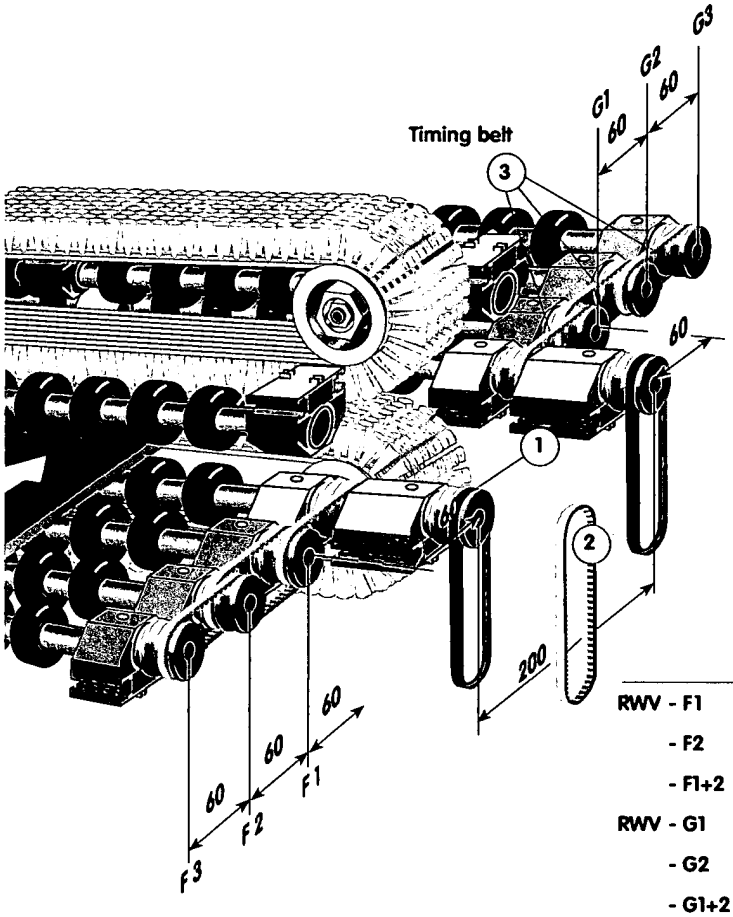
Order code	Description	Quantity
700-010	**Roller shaft** pitch T = 50 mm with polyamide rollers	2

Option Ground wheels for smooth concentric running (e.g. for pressure sensitive surfaces) are available upon request (additional charge).



The drive belts of the height adjustment are progressively adjustable to the respective working height.

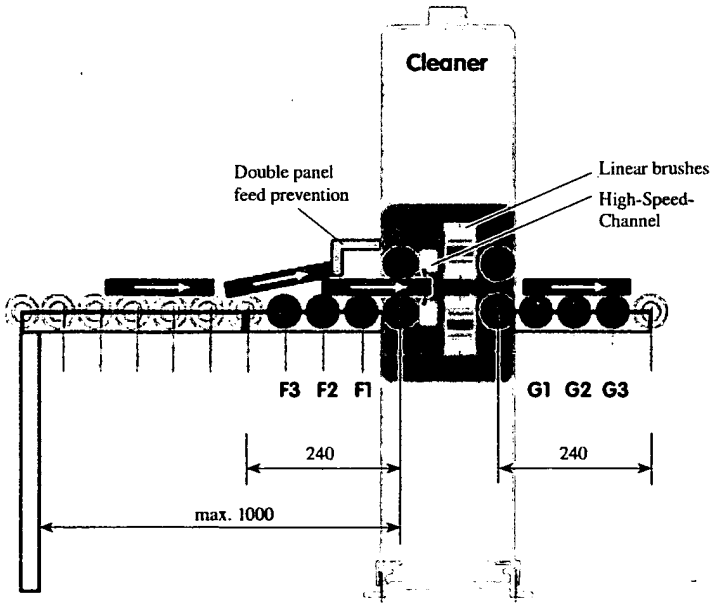




Transport roller shaft extension (RWV)

Order code		Description
		Transport roller shaft extension (viewed from infeed) infeed (F), outfeed (G)
Set:		Transport roller shaft extension for transport roller shaft (see above) with bearings, drive and guard for belts.
91 09 388	(1)	**Timing belt** 10 AT 10-525
91 09 409	(2)	**Timing belt** 10 AT 5-255

		Number of roller shaft pieces 1	2	3	4	5
RWV - F1	**705-**	**-011**	**-012**	**-013**	**-014**	**-015**
- F2	**705-**	**-021**	**-022**	**-023**	**-024**	**-025**
- F1+2	**705-**	**-031**	**-032**	**-033**	**-034**	**-035**
RWV - G1	**705-**	**-111**	**-112**	**-113**	**-114**	**-115**
- G2	**705-**	**-121**	**-122**	**-123**	**-124**	**-125**
- G1+2	**705-**	**-131**	**-132**	**-133**	**-134**	**-135**



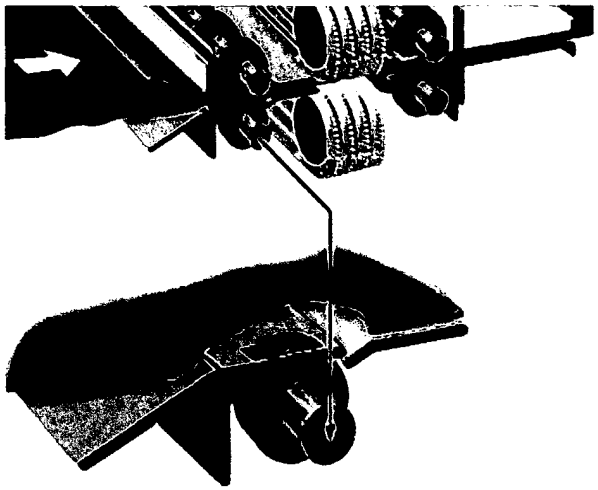
Ordering example for transport roller shaft extension (60 mm at infeed) for Cleaner with nominal width A: 1500 mm, stainless steel shaft with polyamide rollers, pitch T = 100 mm

Order code	Description	Quantity
705-012	**RWV-F1**	**1**
701-010	**Roller shaft pitch** T = 100 mm with polyamide rollers	**2**

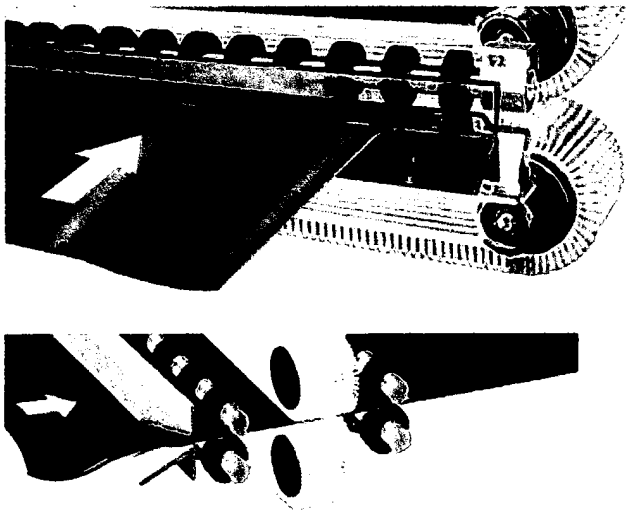
	Double panel feed prevention DPA 10/A/... A	
23 17 403	400 mm	
23 17 404	520 mm	
23 17 405	650 mm	
23 17 406	850 mm	
23 17 407	1000 mm	
23 17 408	1100 mm	Double panel feed prevention
23 17 409	1300 mm	may only be used
23 17 410	1500 mm	if transport speed is
23 17 411	1650 mm	≤ 30 m/min and
23 17 412	1750 mm	panel weight is ≤ 10 kg

Panel transport, guide plates, round belt guides

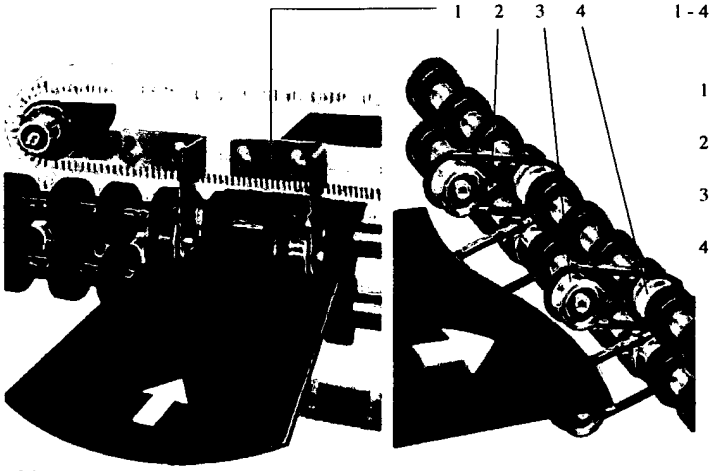
0.1 – 0.5 mm material thickness



0.5 – 2 mm material thickness



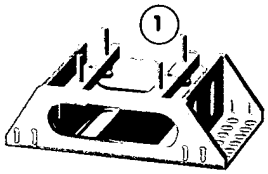
0.5 – 8 mm material thickness

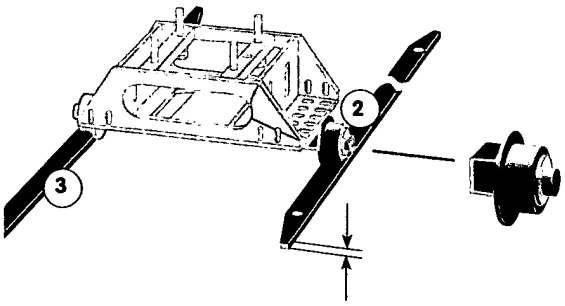


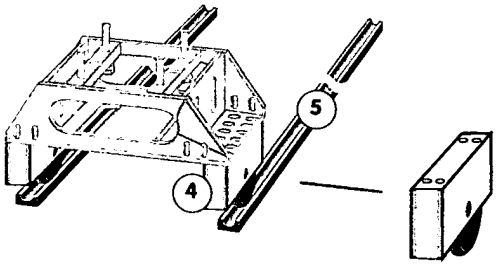
Order code		Description
		Guide plates for HPL (high pressure laminate)
	A mm	400 650 850 1000 1100 1300 1500 1650
upper 720- / lower 722-		-003 -005 -006 -007 -008 -009 -010 -011
	A mm	1750 2000 2200 2500 2750 3000 3200
upper 720- / lower 722-		-012 -013 -014 -015 -016 -017 -018
		Guide plates for Cleaner (upper/lower surface)
	A mm	400 650 850 1000 1100 1300 1500 1650
upper 710- / lower 712-		-003 -005 -006 -007 -008 -009 -010 -011
	A mm	1750 2000 2200 2500 2750 3000 3200
upper 710- / lower 712-		-012 -013 -014 -015 -016 -017 -018

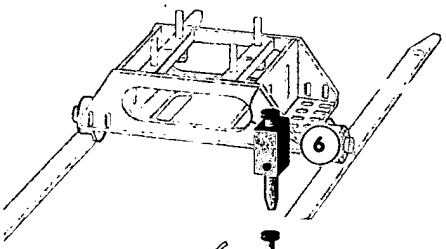
1 - 4	**23 17 058**	**Round belt guide** may be mounted at upper or lower roller shaft (driven)
1	**23 17 057**	**Mounting bracket infeed**
2	**91 09 259**	**Round belt** Ø 8 x 250
3	**52 10 085**	**Pulley** Ø 40 with ball bearing
4	**23 17 068**	**Split pulley** for round belt guide

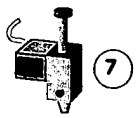
Cleaner on wheels

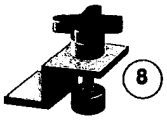






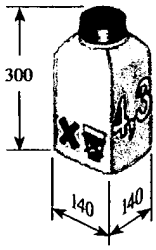


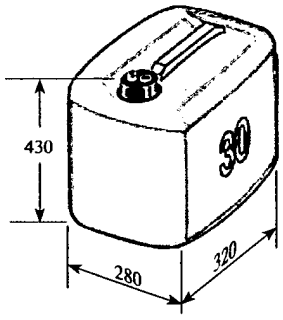




	Best.-Nr.	Artikel/Lieferumfang
1	**54 51 506**	**Machine base for wheels** Working height H = 900 – 950 mm The wheels may be fitted to the existing machine base of the Cleaner CF 05 without retouching work.
2	**453 - 001**	**Wheels LR 04/75 with collar** including mounting plate and fastening components Note: 1 Cleaner CF 05 requires 4 wheels.
3	**41 31 442**	**Flat rail** (in metres) Thickness 25 mm
	54 51 381	**Flat rail** (in metres) Thickness 15 mm
4	**91 15 364**	**Mounting bracket** (Strothmann) for wheels suitable for round rails Ø 25
5		**Round rails made by Strothmann** Ø 25 – in metres
	91 15 465	**Adapter** for Strothmann mounting bracket
6	**453 - 013**	**Stop bolt RB 04/M16** with mounting and fastening bracket Note: 1 bolt is sufficient for a Cleaner CF 05
7	**453 - 013**	**Stop bolt with sensor**
8	**453 - 012**	**Stopper SR 04/M16** with rubber coating including Z-angle and fastening components. Note: 2 stoppers are recommended for 1 Cleaner CF 05

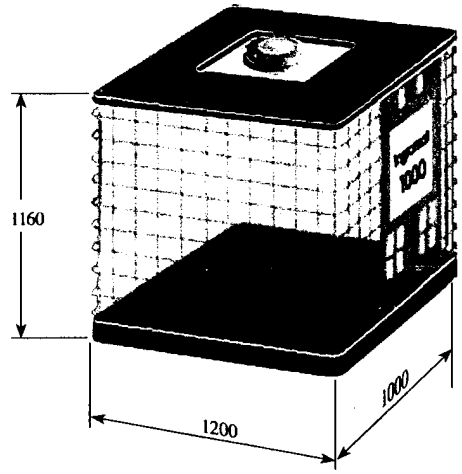
Ingromat™- Anti-static cleaning fluid





Application

prior to laminating, lacquering,...

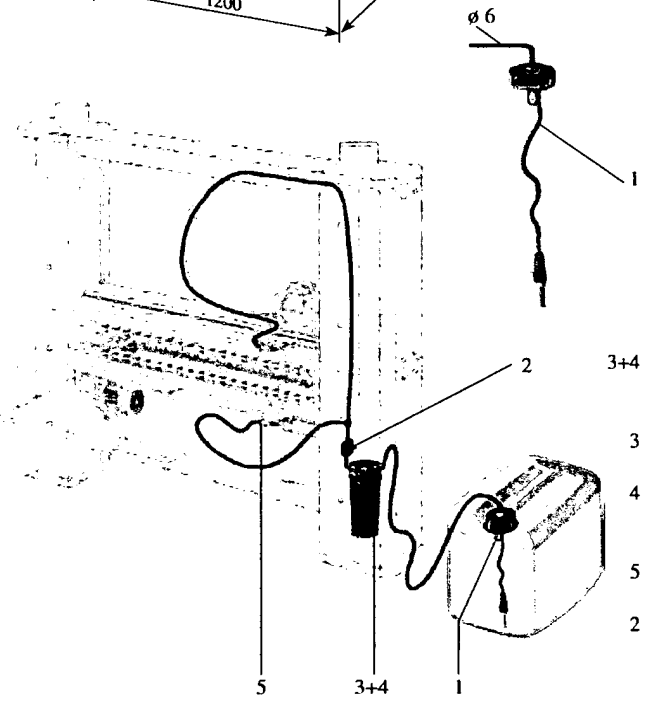


Application

for finished surfaces

Application

for the printing industry

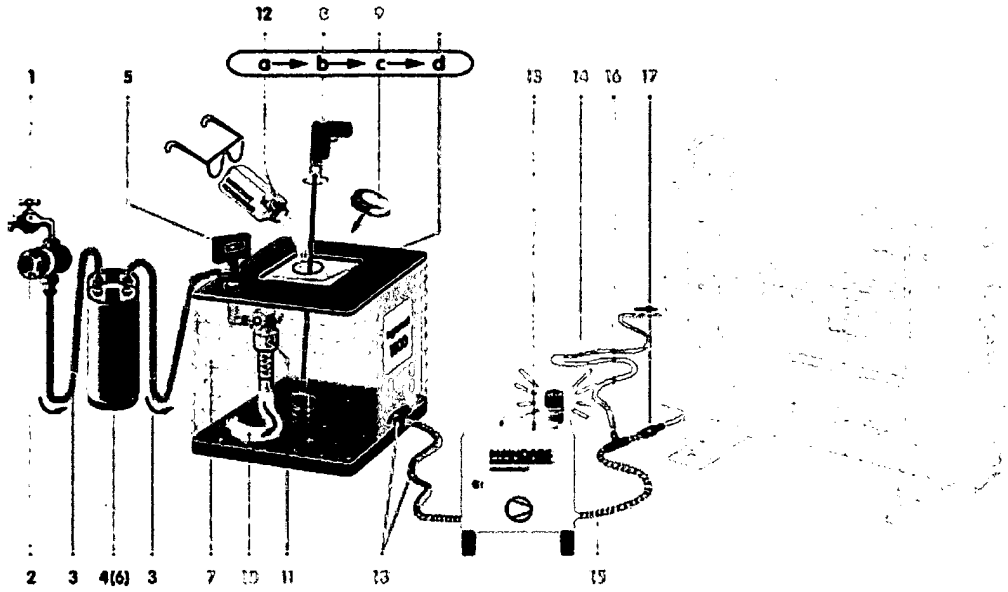


Order code	Description
280-001	**Ingromat A™** anti-static cleaning fluid 30 litre ready to use
280-100	**Ingromat A™** anti-static cleaning fluid 1000 litre ready to use
280-200	**Once-off deposit** for exchange container 1000 litres
280-511	**Ingromat FL™** anti-static cleaning fluid 30 litre ready to use
280-512	**Ingromat FL™** anti-static cleaning fluid 1000 litre ready to use
280-501	**Ingromat FL™ concentrate** anti-static cleaning fluid 4.3 kg liquid sufficient to convert 1000 litres of demineralised water (max 3.0 µS/cm conductivity) into Ingromat FL ready to use
280-060	**Ingromat P™** anti-static cleaning fluid 30 litre ready to use
280-061	**Ingromat P™** anti-static cleaning fluid 1000 litre ready to use
280-063	**Ingromat P™ powder** anti-static cleaning agent, 5 little bags with 62.5 g each to produce 5 x 1000 litres of ready to use Ingromat P
1227-700	**Suction pipe with screw cap and filter** for 30 litre container (Europe) or 6 gallon container (USA) 1 m PUN hose, green Ø 6
23 13 224	**Ingromat main filter** complete with filter insert and screw cap
91 06 013	**Ingromat main filter housing** AVPP, blue (without filter insert)
91 06 149	**Filter insert** 5 µm for Ingromat main filter housing
23 13 225	**Ingromat safety filter** WK 21, 50 µm
91 02 607	**Ingromat valve** type 0127 1/8", 24 V/DC
280 - 070	**T-connection** with 3 m PUN hose Ø 6

Note: Please request separate information when ordering for the US market.

Ingromat™ central supply system

max. 5 Cleaner

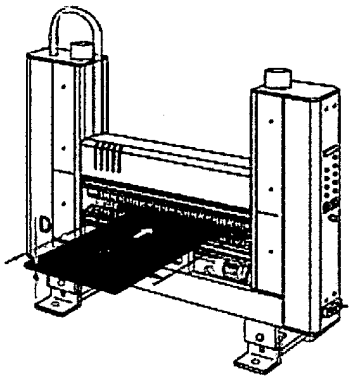


(if you are not using Ingromat FL concentrate
items 1-2 will not be required)

Item	Order code	Description
1	–	Water tap, maximum 6 bar Water pressure 3/4" or 1" gas
2 - 6	**280-202**	**Water treatment**
2	91 03 196	Water time switch (120 min.)
3	23 13 219	Pressure-resistant hose with coupling, 1m x 1/2"
4	280-203	Cartridge for demineralisation of water (filled)
5	91 07 124	Battery powered conductivity meter. Max. reading 3.0 µS/cm indicates "change cartridge".
6	280-204	Deposit for cartridge
7 - 11	**280-201**	**Ingromat container**
7	23 13 221	Ingromat container, 1000 litre (empty) Production of Ingromat FL (in sequence a-d)
8	–	Stirrer (not supplied)
9	23 13 231	Cover for 1000 litre container with pressure release filter
10	91 03 009	Float valve hose at float valve
11	23 13 196	Float valve (includes item 10)
12	**280-501**	**Ingromat FL™ concentrate** 4.3 kg sufficient for 1000 litres

Item.	Order code	Description
13	**280-612**	**Ingromat Central Supply IS 12 (pump)** Connection: 1) 230 V, 50 Hz and 110 V 60 Hz 2) Compressed air: 6 bar, filtered, oil free, 1/4" gas and 8 mm PUN hose 3) Ingromat in Ø 8 4) Ingromat out Ø 8 The central supply IS 12 pump can be used for up to 5 Cleaners, maximum distance to the Cleaners must not exceed 300 m
14	**91 03 189**	**ø 6 mm PUN hose,** in metres, please state length required when ordering
15	**91 03 350**	**ø 8 mm PUN hose,** in metres, please state length required when ordering
16	**91 02 423**	**T-connection** ø 8 ø 8 ø 6
17	**91 02 428**	**Reduction** ø 8 ø 6
18	**23 13 347**	**Ingromat connection set** for 1000 litre container with 5 m of hose (Ø 8, green), adjustable screw cap

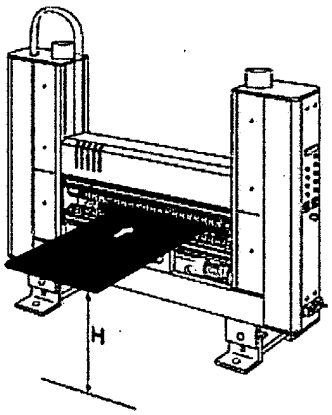
Wandres Cleaner ordering guide / checklist



Nominal width A = centre distance of outer brush drive pulleys, maximum cleaning width is A- 80 mm
Example: a Cleaner for panels with a max. width of 1400 mm and a thickness of 8 mm has order no. 1710-010.

1 **Type of Cleaner** see page 10 - 21

Order code								Nominal width A
page 11	page 11	page 13	page 15	page 15	page 17	page 19	page 21	
1710-	1711-	1714-	1631-	1621-	1721-	1731-	1741-	
-003	-003		-003	-003		-003	-003	400 mm
-004						-004	-004	520 mm
-005					-005	-005	-005	650 mm
-006	-006		-006	-006	-006	-006	-006	850 mm
-007	-007	-007	-007	-007	-007	-007	-007	1000 mm
-008		-008			-008	-008	-008	1100 mm
-009		-009			-009	-009	-009	1300 mm
-010	-010	-010	-010	-010	-010	-010	-010	1500 mm
-011	-011	-011	-011	-011	-011	-011	-011	1650 mm
-012		-012			-012	-012	-012	1750 mm
-013		-013			-013	-013	-013	2000 mm
-014		-014			-014	-014	-014	2200 mm
-015		-015			-015	-015	-015	2500 mm
-016		-016			-016	-016	-016	2750 mm
-017		-017			-017	-017	-017	3000 mm
-018					-018			3200 mm
					-019			3500 mm
					-020			3750 mm
					-021			4000 mm
					-022			4300 mm
					-023			4500 mm
					-024			4750 mm
					-025			5000 mm

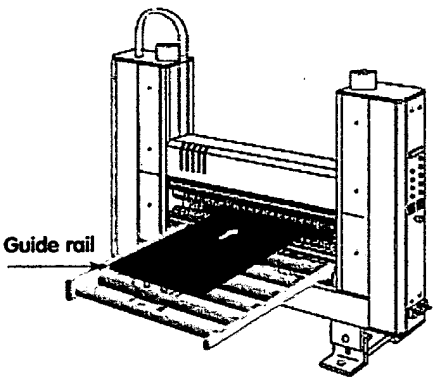


2

Order code	Working height H
450 -016	720 mm
-018	750 mm
-019	800 mm
-020	850 mm
-021	900 mm
-022	950 mm
-023	1000 mm
-024	1050 mm
-025	1100 mm
-026	1150 mm
-027	1200 mm

H = working height
Distance from underside of sheet or panel to the floor

Cleaner feet may be adjusted
Nominal size H ± 30 mm

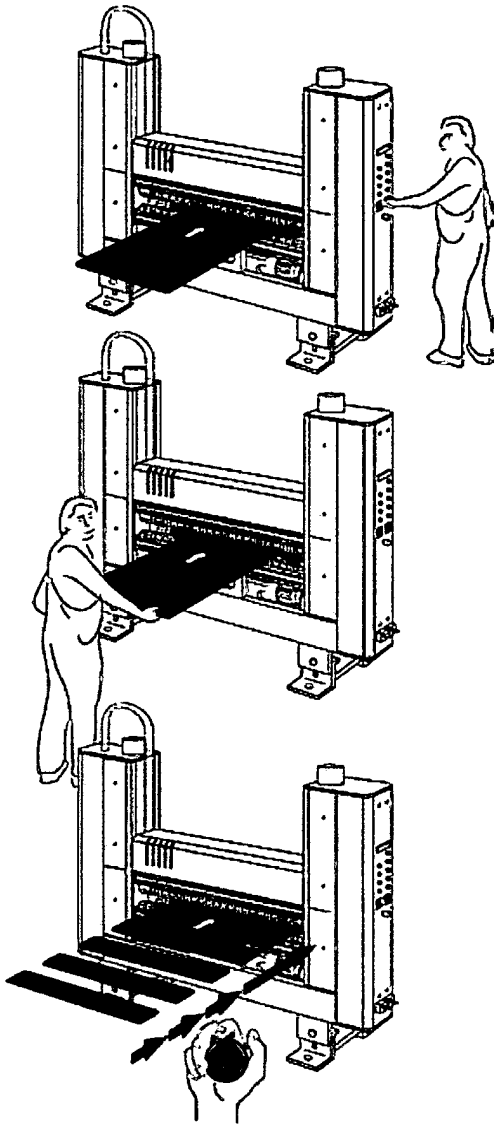


3

Order code	**Guide rail** when looking into transport direction
450 -100	
-101	
-102	
-103	

The location of the guide rail (edge guide, reference edge etc.) dictates the wiping direction of the upper linear brush and the position of the product recognition sensor.

Wandres Cleaner ordering guide / checklist

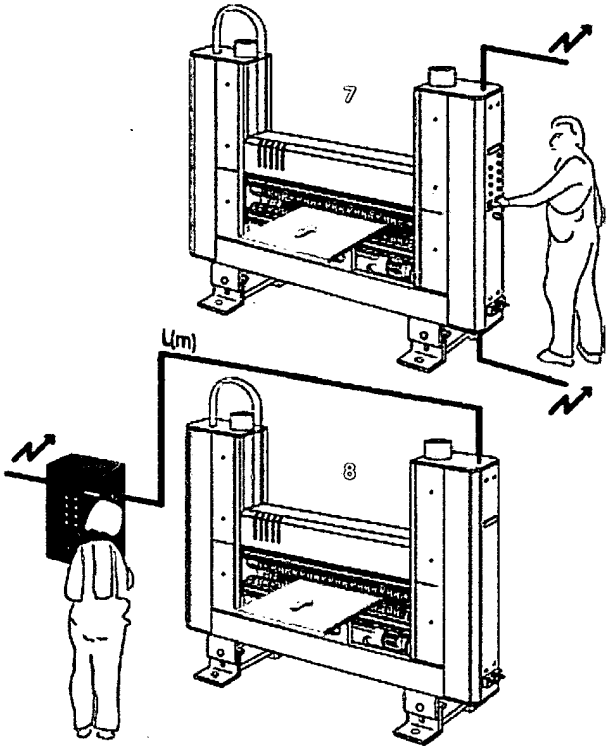


	Order code		Description
			Operating side
4			when looking into transport direction
	450 - 105		Left
	- 106		Right
	- 107		Separate control cabinet, emergency adjustment for cleaning modules, left
	- 108		Ditto emergency adjustment, right
			Product feed
5	**450 - 110**		Cleaner is installed into automated production line (enclosed). There is no danger of employees accidentally trapping their hands in the transport rollers.
	- 111		Manual throughput of product. There is a danger of employees accidentally trapping their hands in the transport rollers.
			Transport speed
6			The Cleaner has an inverter-controlled threephase drive. A belt system adjusts the drive to the chosen speed range. The 24 V – electrical input (Continuous signal) of the frequency controller (Siemens) initiates the rotation of the transport rollers. The set transport speed is displayed digitally. The following speed ranges are available:
6.1	**450 - 120**	*	v_1: 2 – 7 m/min
	- 121		v_2: 5 – 15 m/min
	- 122		v_3: 10 – 64 m/min
	- 123		v_4: 20 – 140 m/min
	- 124		v_5: 50 – 180 m/min
	- 125		v_6: 80 – 240 m/min
6.2	**450 - 130**		Required infeed speed (inverter controlled) set in inching mode and digital display in m/min.
	- 131		Reference input 0-10 V
	- 132		Digital reference input There are 2 electrical inputs available, providing 4 programmable speed control options
			Example:
			a) 0 0 ≙ creep speed = ?? m/min
			b) 0 1 ≙ set-up speed = ?? m/min
			c) 1 0 ≙ normal speed = ?? m/min
			d) 1 1 ≙ fast speed = ?? m/min
			Input: 24 V please specify when ordering
	450 - 133		Digital speed display xxx,x m/min
	450 - 134		Digital speed display xxx,x feet/min

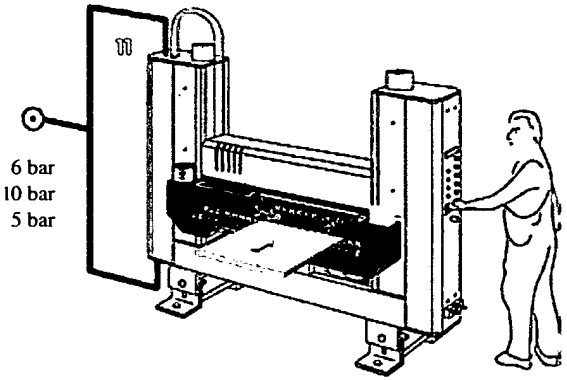
Note:
In most cases, there will only be 2 speeds,
e.g.
$v_{a)}$ = 10 m/min
$v_{b)}$ = 50 m/min

Wandres Cleaner ordering guide / checklist

Preliminary note:
The electrical supply is always on the operating side of the Cleaner. The cable is fed into the electrical column either from above or from below.

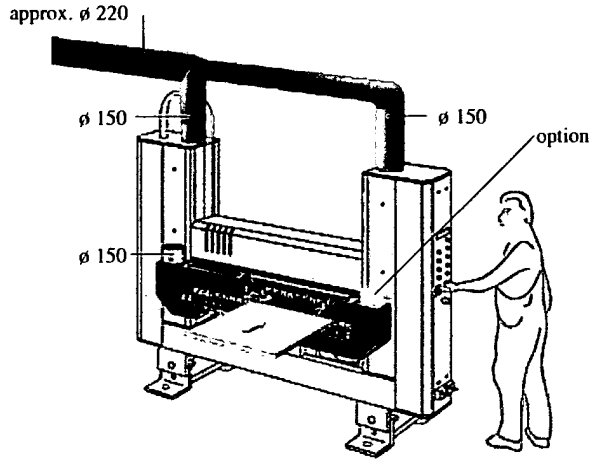


Preliminary note to item 11:
The compressed air is always connected to the column opposite the operating side either from above or from below.
Quality requirement regarding compressed air:
dry, dew point: ≤ 5° C
oil free: < 1.5 mg/m^3_N at 24° C filtered (< 40 µm)

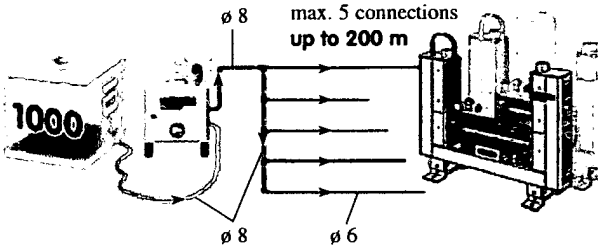


	Order code	Description
7		**Electrical supply**
7.1		**Distribution voltage** (choice)
	450 - 140	230 V/400 V, 50 Hz, with neutral
	- 141	ditto, without neutral
	- 142	500 V, 50 Hz , with neutral
	- 143	ditto, without neutral
	- 150	3 x 440 – 480 V, 60 Hz, with neutral
	- 151	ditto, without neutral
7.2		**Control cabinet**
	451 - 140	Control cabinet integrated in machine frame (standard)
	- 141	Separate control cabinet
	- 142	Connected to a terminal strip Control cabinet will be integrated into overall installation.
7.3		**Cable length** L = cable length between Cleaner and control cabinet in metres
	451 - 160	5 m
	451 - 161	10 m
	451 - 162	15 m
	451 - 163	20 m
8		**Explosion risk**
	451 - 170	Explosion-proof version (class I to DIN) If there is no explosion risk, this position does not apply
9		**Standards, regulations**
	450 - 160	DIN ISO
	450 - 161	VDE
	450 - 162	UL
	450 - 163	CSA
	450 - 164	Customer specific regulations
10		**Opterating instructions** please specify language and number of operating manuals
	451 - 001	Operating instructions in German
	451 - 002	Operating instructions in English
	451 - 003	Operating instructions in French
	451 - 004	Operating instructions in Italian
	451 - 005	Operating instructions in Spanish
	451 - 006	Operating instructions in Dutch
11		**Pneumatic connection**
		<u>for Cleaner without Tornado-Channel:</u>
	450 - 180	Compressed air line connection 6 bar, 3/4" from above
	- 181	ditto from below
	- 182	10 bar, 3/4" from above
	- 183	ditto from below
	- 184	5 bar, 1" from above
	- 185	dito from below
		<u>for Cleaner with Tornado-Channel:</u>
	- 186	6 bar, 1" from above
	- 187	ditto from below
	- 188	10 bar, 1" from above
	- 189	ditto from below

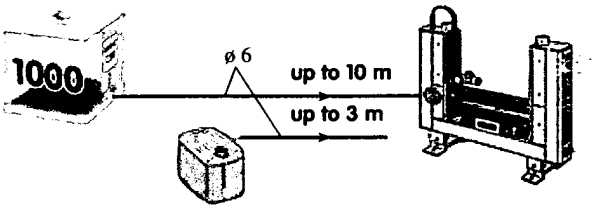
Wandres Cleaner ordering guide / checklist



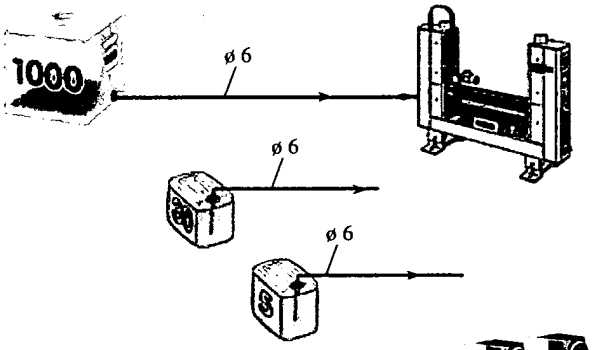
	Order code	Description
12		**Suction/connections on the Cleaner**
		for Cleaner without Tornado-Channel:
	450 - 200	upward 2 x Ø 150
		for Cleaner with Tornado-Channel:
	450 - 201	upward 3 x Ø 150, A ≤ 850
	450 - 202	upward 4 x Ø 150, A > 850



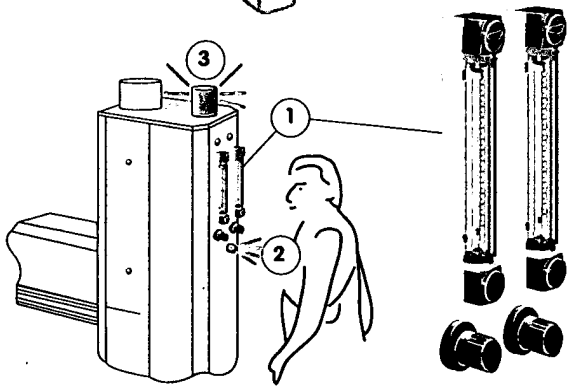
13		**Ingromat supply**
	450 - 220	**Cleaner version Z**
		for connecting Cleaner to an
		Ingromat central supply system
		(see page 29)
	- 221	**Cleaner version M**
		Cleaner with
		integrated Ingromat pump
		(self priming) with dry-running monitor and
		flashing indicator (yellow)



14		**Ingromat connection sets**
	23 13 348	Ingromat connection set for
		1000 litre container with 10 m of hose
		(Ø 8, green), lid and reduction to Ø 6

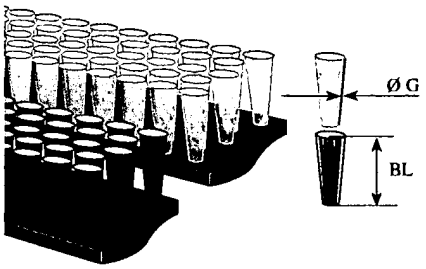


	23 13 273	Ingromat connection set for
		30 litre container with 1 m of hose
		(Ø 6, green), suction filter and lid
		also suitable for
		5 gallon container (USA, approx. 20 l)
		with 1 m of hose (Ø 6, green),
		suction filter and lid
		Ingromat samples available upon request.



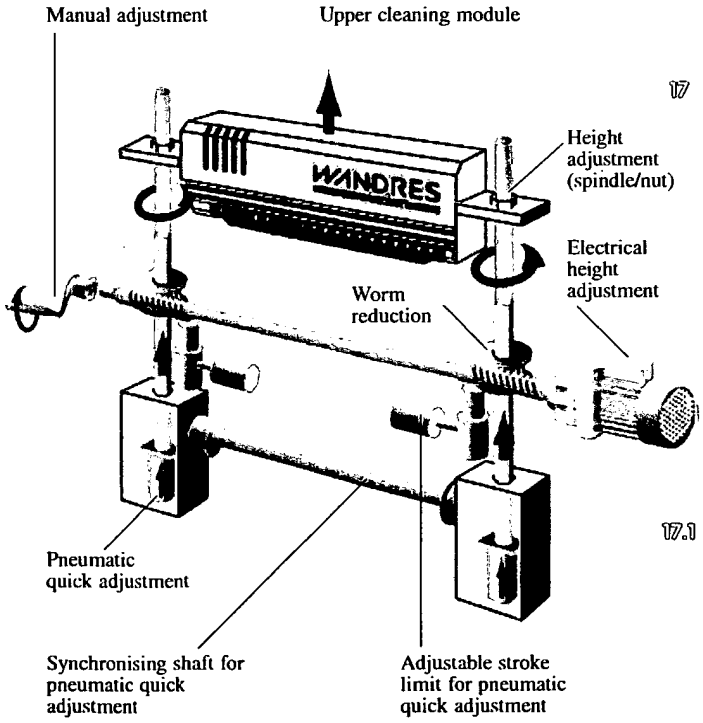
15		**Ingromat usage indicator**
	450 - 240	Ingromat usage indicator
		with flow meter
①		(standard)
		located opposite the operating side
②	**- 241**	Ingromat dry-running monitor with small
		flashing indicator (standard, operating side)
③	**- 242**	Ingromat dry-running monitor
		with large flashing indicator (option)

Wandres Cleaner ordering guide / checklist



Order code	Description
16	**Linear Tresy brushes** with filament length BL 19 mm
450 - 250	**Standard version** for cleaning modules upper and lower cleaning modules have identical linear tresy brushes **Special version** Please describe your application.
450 - 251	blue (standard)
450 - 252	white (brushes have guarantee against loss of filaments)
450 - 253	special version (e.g. BL > 32 mm)

	Filament ø G	Typical applications
450 - 260	0.08 mm	Acrylic sheet Printed circuits
450 - 261	0.1 mm	Varnished surfaces between sanding processes
450 - 262	0.15 mm	Furniture panels Floor laminate Melamine
450 - 263	0.2 mm	Steel Press blanks
450 - 264	0.3 mm	Usually only for first row of linear brushes (risk of scratching material)



17

Brief information on the height adjustment for cleaning modules

The cleaning modules are perpendicularly adjusted via the spindles located in the housing.
This can always be done manually. Additional electric drives are available.
(1 drive where A ≤ 2200,
2 drives where A > 2200 mm)

The digital-mechanical position indicator displays the position of the cleaning modules. Where rapid adjustments are necessary (e.g. if there is a risk of material collision) additional pneumatic quick adjustments are available.

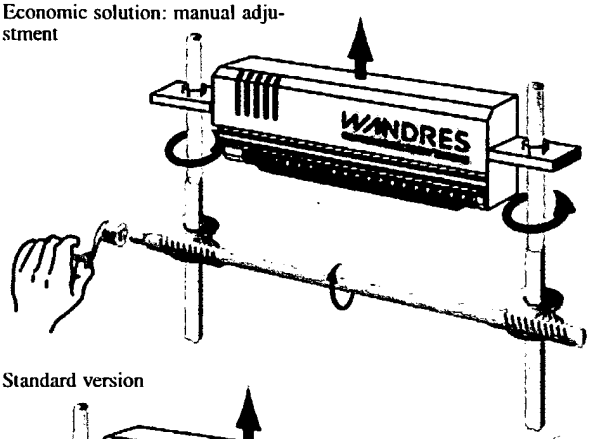
17.1

Position indicator

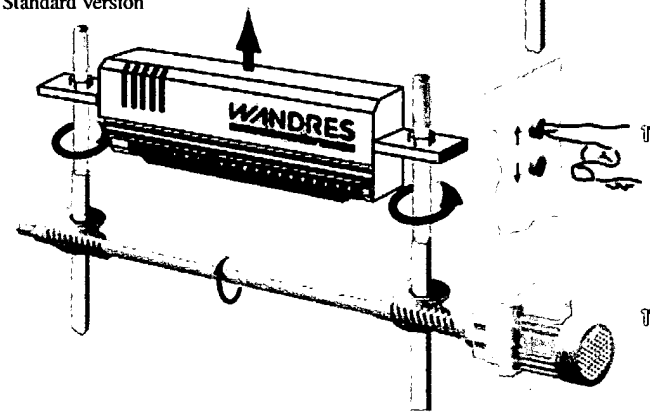
450 - 300	Position indicator for the cleaning modules in millimetres, digital display 0.1 – 999.9
450 - 301	ditto in inches, digital display 0.01 – 99.99

Wandres Cleaner ordering guide / checklist

Economic solution: manual adjustment

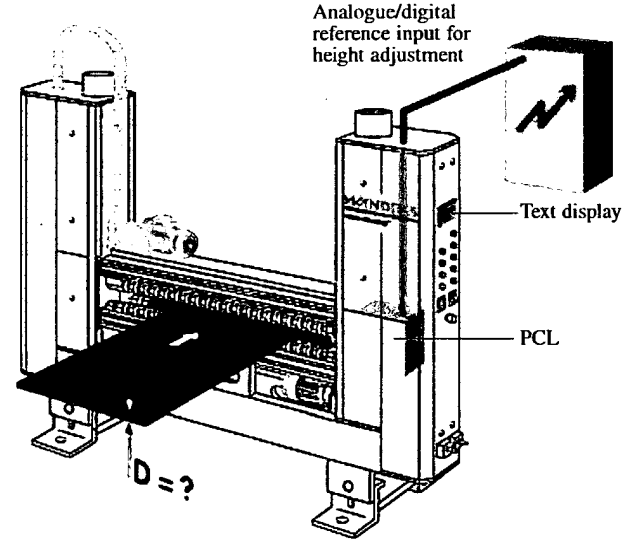


Standard version



	Order code	Description
17.2	**450 - 310**	**Manual height adjustment (economy solution)** Manual height adjustment type HVM 1/O/U for cleaning modules
17.3	**450 - 450**	**Electrical height adjustment** type HVE 1/O/230 V/10-50 Hz/Lenze inching mode
17.4	**450 - 500**	**HVE control (inching mode)** • for upper cleaning module • with change-over switch to creep speed/fast speed
	450 - 401	**PLC made by Siemens**
17.5	**450 - 600**	**External controls** External electrical controls combined with logic controls type Siemens S7-200 with text display TC 200

External controls

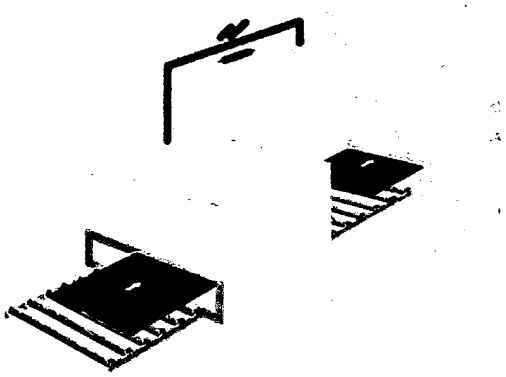


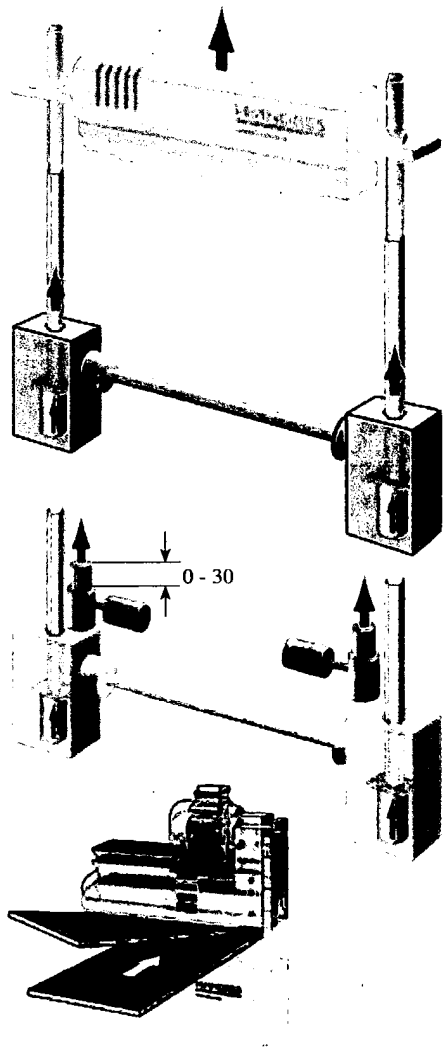
External reference input for the height adjustment for the upper cleaning module

	Digital inputs	Adjustment range D (= working area)
450 - 650	12 bis signal 224 V-	0-100 mm
450 - 651	BCD (12 bit wide)	1 Bit = 0.1 mm
450 - 652	Profi bus	

	Analogous inputs	Adjustment range D
451 - 650	0-10 V–	0-100 mm
451 - 651	0-5kΩ	0-100 mm
451 - 652	0-10 V	range of values here, an approximate analogue value (reference input) corresponds to a fixed actual value, e.g. 1.5 – 2.3 V = 19 mm panel thickness
451 - 653	0-5 kΩ	range of values with linear potentiometer 00-100 mm = 0.5 kΩ When ordering, please provide information regarding panel thickness at our production line.

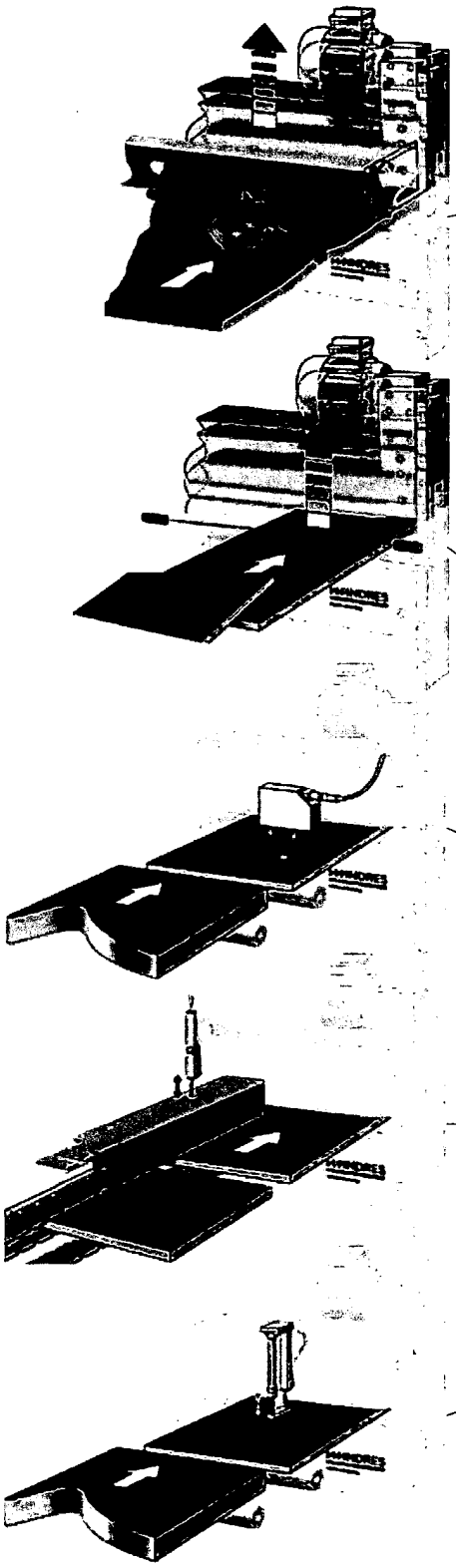
Wandres Cleaner ordering guide / checklist





	Order code	Description
18		**Exchange of data**
	450 - 700	Cleaner stands alone without external signals from other machines (stand-alone solution)
	450 - 701	Cleaner is integrated into a production line. Please enclose list with required inputs and outputs or alternatively provide name of person responsible (including telephone number etc.)
19		**Special controls**
	450 - 800 bis **- 899**	Reserved for special controls e.g. Homatic etc.
20		**Pneumatic adjustment for cleaning modules**
		Preliminary note: The purpose of the pneumatic adjustment is • to switch between different panel thickness e.g. 19 and 24 mm • to protect the upper cleaning module from material collisions
20.1		**Pneumatic quick adjustment**
	450 - 900	Typ HVP 1/O/50 • for upper cleaning module • with maximum thickness variation 50 mm • parallel adjustment by rack and pinion • stroke is set by variable spacers
	450 - 902	Type HVP 1/O/6 short stroke, 6 mm
	451 - 901	Typ HVP 1/U/5 • for lower cleaning module • with down-travel of 5 mm (linear brush no longer has contact with surface of subject material)
20.2	**450 - 910**	Crash Protection CPO/1/80 • for upper cleaning module • when activated, upper cleaning module moves up quickly by 80 mm
	450 - 920	Pneumatic quick adjustment and crash protection CPO/1/80 + HVP 1/O/30 Depending on external signal, there will be a quick adjustment of maximum 30 mm (settable thickness variation = partial stroke or a total stroke of 80 mm)
20.3		**Override protection**
	451 - 930	Pneumatic override protection HVP 1/O/D_{max} The upper cleaning module moves upward. The holding pressure can be adjusted via a pneumatic pressure regulator
	451 - 931	Mechanical override protection Switch-off of Cleaner if thickness tolerance is exceeded.

Wandres Cleaner ordering guide / checklist



	Order code	Description
21		**Product recognition** A sensor for product recognition is always installed at the infeed to the Cleaner
21.1		**Crash-fit guard** CWO/1/A for Cleaner CF 05...

Order code	Nominal width A	Order code	Nominal width A
452- 003	400	**452- 015**	2500 mm
- 004	520	**- 016**	2750 mm
- 005	650	**- 017**	3000 mm
- 006	850	**- 018**	3200 mm
- 007	1000	**- 019**	3500 mm
- 008	1100	**- 020**	3750 mm
- 009	1300	**- 021**	4000 mm
- 010	1500	**- 022**	4300 mm
- 011	1650	**- 023**	4500 mm
- 012	1750	**- 024**	4750 mm
- 013	2000	**- 025**	5000 mm
- 014	2200		

21.2	**480 - 020**	**Laser light barrier** for Cleaner CF 05 to detect a crash situation, includes mounting bracket. Laser beam positioned approx. 250 mm before material infeed to the Cleaner.
21.2	**480 - 040**	**Ultrasonic thickness measuring system**
21.3	**91 12 198**	**Linear potentiometer** TRS 50, 0-5 kΩ = 0-100 mm stroke
21.4	**480 - 030**	**Thickness measurement system DMS 100/5000** Pneumatic cylinder with a parallel linear potentiometer (0-5 kΩ). The panel must be stopped approx. 0.5 s during the measuring process.

000089

Company address / stamp

Questionnaire to fax back to fax number 49 (0)7661 / 93 30-30

for micro-cleaning
of sheets, panels and webs

WANDRES GmbH micro-cleaning
Dorfstr. 12, D-79256 Buchenbach-Wagensteig, Germany

Material

Product: _____

or material: _____

Product dimensions:

Width: min._____ , max._____ mm

Length: min._____ , max._____ mm
∞ bei endlos

Thickness: min._____ , max._____ mm

or weight: _____ g/m²

Cleaning process

Clean both sides (top – bottom)? yes ☐ no ☐

Is a light brushing of the surface allowed? yes ☐ no ☐

Are the particles in the air as well as from preceding processes ? yes ☐ no ☐

Is there an electrostatic charge present? yes ☐ no ☐

Electrical supply

Available voltage ☐

230/400 V, 50 Hz or
240/450 V, 50 Hz

3 x 440-480 V, 60 Hz ☐

Other voltage (please specify) _____ ☐

Should we offer control cabinet? ☐

Should motor controls be incorporated into an existing control cabinet? ☐

Contact: _____

Position: _____

Department: _____

Telephone: _____

Fax: _____

Product flow

Process speed: min._____ , max._____ m/min.

Working height: _____ mm
(= distance to floor)

Guide rail in transport direction left ☐ right ☐
Operating side in transport direction left ☐ right ☐

Will the system be linked to a production line? yes ☐ no ☐

Do you need an electric height adjustment for the Cleaner? yes ☐ no ☐

Working area

Is the working area a Clean Room? yes, class ____ ☐ no ☐

Is the area an explosion risk area? yes, class ____ ☐ no ☐

Where will the air be discharged?

Back into the work area ☐

Into an existing ventilation system ☐

Into an existing central extraction system ☐

Other:

Language of operating instructions _____

Number of operating instructions _____

Comments _____

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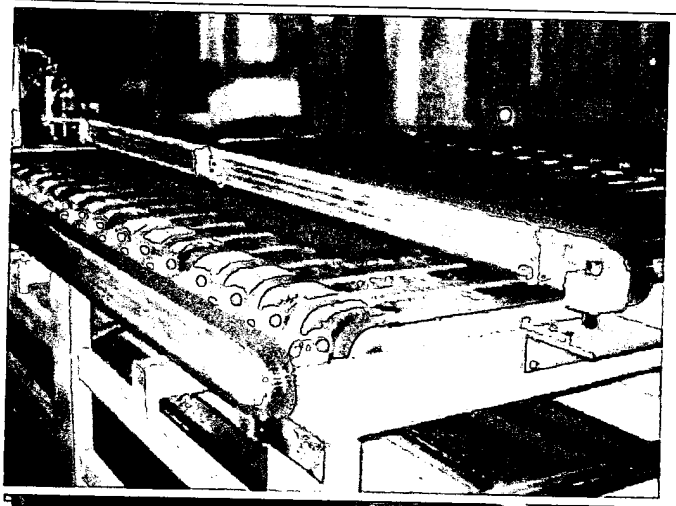
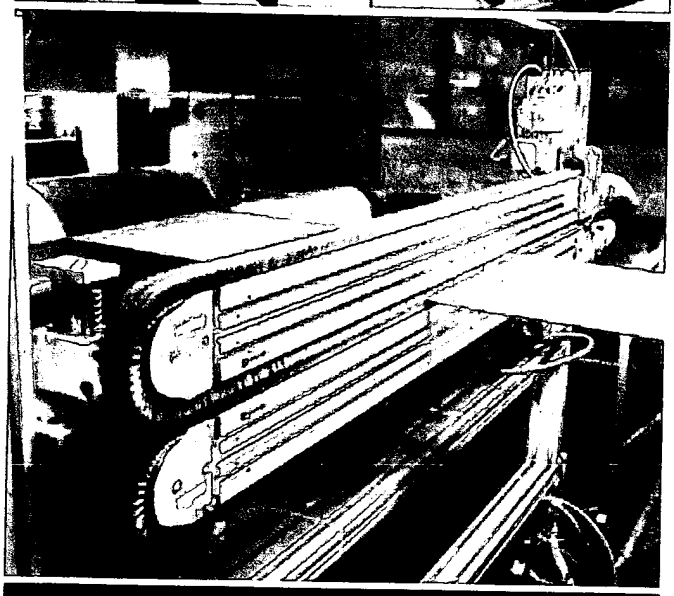
Wandres micro-cleaning for your products

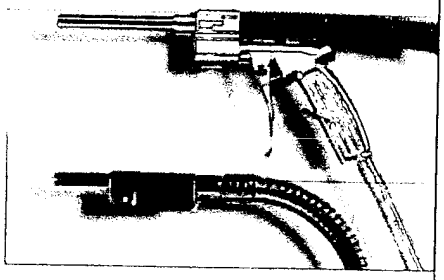


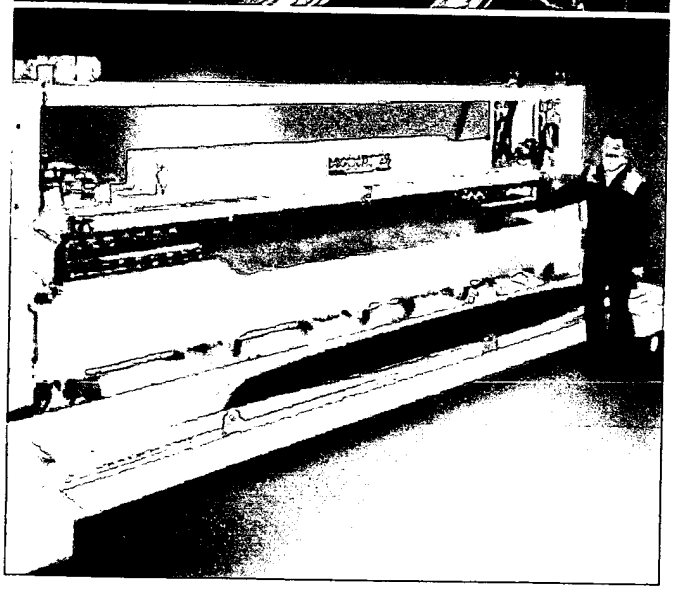
Sword Brush
double-sided cleaning of boards



double-sided cleaning of paper/
foil webs

Suction gun + Vac-blast cleaner





EVOMAT Cleaner
for the cleaning of blanks

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micro-cleaning

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